



FRIDAY, NOVEMBER 29, 1895.

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Contributions.

The Throttle and Dry Steam.

RICHMOND, Va., Nov. 22, 1895.

TO THE EDITOR OF THE RAILROAD GAZETTE:

A very interesting point is apparent in the discussion of the Chicago & Northwestern compound test, at the Western Railroad Club, published in your issue of 15th inst., which is often a bone of contention between master mechanics and their locomotive engineers.

All of the gentlemen who spoke made the point that the compound's economy is mostly due to the lesser range of temperature, when the steam is expanded in two cylinders than when in one. This statement, of course, means that there is less cylinder condensation in the one case than in the other.

In your editorial you question the advisability of having a high boiler pressure and using a light throttle, thus reducing steam-chest pressure. Now this is a very old subject, and yet I believe that few men realize that a light throttle is often the most economical throttle to use.

With our recent high boilers and short domes there is great difficulty in getting dry steam, and with the old boilers, when they are at all dirty, the steam is often far from dry when taken into the cylinders.

I believe on many, indeed all, engines there is a certain throttle opening which conduces to a maximum efficiency by superheating the steam sufficiently in its passage through the contracted opening to at least insure dry steam in the cylinders, and at the same time maintain a good initial pressure in the chests.

I put an automatic cylinder cock on "Tramp" engine 2427 of the Richmond Locomotive Works, and was enabled to observe the condensation—the ultimate condensation—very closely, by the escape of water from the low-pressure cylinder. I found this water very much less, when running at 30 or 40 miles an hour, with a partly opened throttle than when it was open wide, and the engine would do very obviously better under the former condition.

Add to this the very prevalent idea of engineers that they must use this light throttle to make time, which is after all the biggest demonstration of the fact.

The point is certainly of enough importance to warrant a shop test that would show which is most efficient, wet steam at boiler pressure in the cylinder or dry steam slightly under boiler pressure. J. H. SYMINGTON.

A Good Old Rail.

We received some time ago from Mr. G. B. Nicholson, Chief Engineer of the Queen & Crescent System, a letter from which some extracts follow:

"I send you a section of a 53-lb. steel rail, made in 1879 by the Edgar Thomson Steel Works, which was laid in the main track of the Cincinnati Southern Railway in 1879, between Lancing and Emory Gap Stations. It had some service from construction trains, and regular trains began running over it Feb. 22, 1880. The rail was taken up in December, 1891, having had practically 12 years' use. I am unable to determine the tonnage which passed over it. At first it was light, but there was a steady and constant increase until, at the time it was taken up, 22 trains passed over it daily.

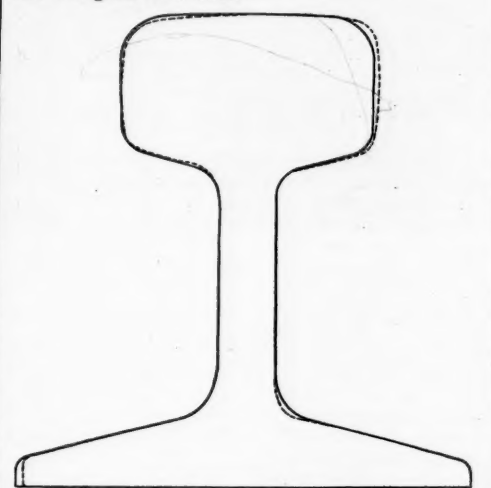
"There were seldom any breakages of the rail and it was finally taken up not because it was worn out, but for the reason that it was too light for the present heavy rolling stock.

"The original height of the rail was 4 1/4 in. So, as you will see by the sample sent, the head is worn down 1/4 in. with 12 years traffic.

"The analysis of this particular specimen is as follows:

Carbon.....	0.327	Silicon.....	0.035
Phosphorus.....	0.002	Sulphur.....	0.067
Manganese.....	1.780		

"This gives you no information as to why the rail should have worn so well. The specimen I send you is not a picked one, but a general sample of what was found on tangents on about 90 miles of road. The enclosed blue print is the best diagram of the rail I can find among the old records."



After 12 Years Service on the Cincinnati Southern.

The engraving is as accurate a reproduction as we can make of the sections sent to us. The full line shows the original section as reproduced from the blue-print; the dotted line shows the section of the actual rail sent to us. The reproduction is about 3/4 of the full size. It will be observed that the wear is almost inappreciable. Assuming that the sections are accurately reproduced, it will be seen that there is a slight wear on one side, presumably the running side, and that on the other side, which we suppose is the outside, the worn section is fuller than the original. There is a slight discrepancy in the two sections shown in one fillet connecting the web with the flange, and a greater one shown on one side of the flange. Some part of these differences may have come from bending or other distortion, and some from corrosion. Some may be from inaccurate work of draughtsmen, and still others from imperfect rolling. At any rate, the differences in the two sections are wonderfully little considering the 12 years of service that the rail had under gone. Practically, we may say that the rail is not worn at all.

It will be seen that this is a low carbon rail and that the phosphorus is higher than recent specifications admit. We should suppose that this is another example of rails that are good because they are well made rather than because they analyze well.

The Painting of Iron Work.

BY A CIVIL ENGINEER.

Two facts have been fully demonstrated by Mr. Emil Gerber's excellent paper, and the discussion which followed it, on "The Painting of Iron Structures Exposed to Weather," read before the American Society of Civil Engineers on May 1, 1895, and previously noticed in the *Railroad Gazette* of April 26.

These facts are: 1. That, although the most interested of all the parties concerned, the engineering profession at large know little of paint; 2. That, owing to this ignorance, a considerable loss is being sustained.

After having read the paper, discussion and correspondence, I am more than ever impressed with the importance of the subject and with the necessity for continued attention to it. Important as is the work of Mr. Gerber in itself, it is small compared with the views and experiences of others that it has brought forth. The abstract which follows contains the points in the different statements which seem most forcible; but every interested person should secure and read the matter in its entirety. Furthermore, much light is thrown upon the subject by the investigations of Messrs. Dudley and Pease, chemists of the Pennsylvania Railroad, an account of whose work is contained in the *Railroad and Engineering Journal* of September, 1890, and the months following.

ABSTRACT OF PAPER AND DISCUSSION.

Mr Gerber.—Have mental clean of scale and rust and suggests the use of revolving wire brushes for the purpose; recommends coating in shop with pure raw linseed oil, which is preferred because it cannot be adulterated so easily as boiled oil. In field painting, surfaces should be free from dampness and paint should not be allowed to freeze. Prefers iron oxide mixed with pure linseed oil. Petroleum products positively injure paints.

C. B. Dudley.—Best paint to prevent corrosion is linseed oil, lamp black and an inert pigment like oxide of iron. Retain as much lamp black as possible having due regard to quickness of drying.

Chas. E. Emory.—Red lead is most relied upon; believes that rusty iron well painted over is almost as well preserved as though painted when clean.

George A. Just.—Patent paints not reliable even to interior iron work; best vehicle is pure linseed oil. Believes that red lead is increasing in favor as a pigment.

Relative Proportions of Pigment to Vehicle in Cost.

Material.	Pigment, per cent.	Vehicle, per cent.
Iron oxide.....	20	80
Red lead.....	75	25

Cost of Bridge Painting, not including scrap—1/4 material, 1/4 labor.

Cost and Capacity of Paints.

Material.	Cost per gallon.	Covering per gallon in sq. ft.	Cost per 100 sq. ft.
Iron oxide.....	0.53	800 to 700	74c. to 9c.
Red lead.....	1.25	500 to 700	18c. to 25c.
Graphite.....	1.10	600 to 800	14c. to 19c.

Cost and Proportions of Mixtures in One Gallon.

Raw linseed oil, 52 cents per gallon = 74 lbs.  
Iron oxide—6 1/4 lbs. at 1 1/4 cents to linseed oil 6 1/4 lbs = \$0.53.  
Red Lead—18 lbs. at 5 cents to linseed oil 5 lbs. = \$1.25.

Formula of Manhattan Elev. R. R. for 50 Gals. "Olive Drab."

	Summer.	Winter.
To be ground in:		
Thayer's raw linseed oil before weighing.....	300 lbs.	275 lbs.
All strictly best quality.....	175 "	150 "
White lead (Jewett's).....	104 "	100 "
French Ochre.....	1 "	1 "
Prussian blue.....	1 "	1 "
Lamp black, strictly best quality.....	3 1/2 "	3 1/2 "
Campbell & Thayer.....	8 gals.	9 gals.
Raw.....	15 "	15 "
Spirit turpentine.....	3 "	3 "
Liquid drier.....	2 "	3 "

Carl Gayler suggests that repainting of bridges should be always done by day-labor and never by contract.

Samuel G. Artlingstall protects bottoms of drawbridges and viaducts (Chicago) with 1 in. matched and dressed pine boards. Believes red lead resists action of gases from coal better than iron oxide.

City of Chicago Specifications.—First coat (shop), pure red lead and boiled linseed oil. Second and third coats (after erection), 8 lbs. iron oxide to 1 gal. boiled linseed oil.

R. Montfort much prefers red lead, because of greater lasting qualities: need not be renewed oftener than once in seven or eight years, as against three years for iron oxide, which was tried and abandoned on Louisville & Nashville. Rust when serious always shows through the paint. Steel more liable to rust than iron. Purity of oil and care of application very important.

W. B. W. Howe says that all circumstances of application must be known before a fair conclusion can be reached. Prefers red lead and particularly for first coat: knows of no failure when properly applied.

Joseph M. Wilson, satisfied with pure iron oxide, mixed with pure linseed oil, but does not believe it better than red lead, except that it is cheaper, less apt to be adulterated and easier to apply. Purity of great importance. After fifteen or twenty years a priming coat of tar paint on Pennsylvania Railroad bridges was found in good condition. Material should be protected with raw linseed oil even before manufacture.

A. E. Hunt recommends 5 per cent. calcium carbonate (powdered limestone), 35 per cent. oxide of iron, 60 per cent. pure linseed oil. The calcium carbonate is for neutralizing any acids that may exist in the paints.

G. H. Thomson suggests applying kerosene to badly rusted bridges and then burning the kerosene with a torch. This changes the yellow (hydrated) oxide to the red (anhydrous) oxide of iron and prevents the rust from spreading.

L. S. Randolph prefers oxide of iron to any lead paint. Lead paint too easily adulterated; out of six samples of white lead only one deserved the name, for it alone contained lead hydroxide. Irridescent bubbles on the surface of linseed oil when shaken indicate the presence of a resin oil or petroleum product.

A. S. Riffe.—Condition of metal before the paint is applied is more important even than the quality of the paint. Prefers well ground oxide of iron.

A. F. Robinson prefers red lead, 33 lbs. to a gallon of oil. First coat covers 930 sq. ft. to the gallon; second coat, 1,200 sq. ft.

O. F. Nichols says it is difficult to tell whether or not oil has been applied at the shop. Serious objection to use of iron oxide paint is difficulty of checking adulteration. Seems unable to reach a conclusion as to comparative merits of lead and iron paints.

F. Collingwood.—Says that Gerber's observations are very correct. Peroxide of iron is not by itself the cause of other rust in iron, but it will hold moisture, and do it in that way: Must be, together with black scale, removed before painting. A slightly sulphurous paint, inert toward the iron, might be a benefit as resisting the action of sulphurous gases on itself. Recommends investigation of a sulphate of zinc paint introduced in England in 1878.

D. Bonteco.—Convinced that red lead is the best paint. Great importance attached to clean metal surface for first coat. If the interval between the paintings of a bridge can be increased the cost of the paint is not an important item.

J. E. Greiner thinks that the author could not have known the composition of the paints applied to the bridges that he visited. Red lead is easy to get pure and can be mixed under personal supervision. Even best results obtained with iron paint were comparatively bad. The writer's rule is 1 oz. lamp black to 1 lb. red lead mixed with pure raw linseed oil in proportion of 10 or 12 lbs., red lead to make a gallon of paint: this costs 90c. for material, 50c. to apply and covers 600 sq. ft. Some

samples of graphite paint behaved well, others badly and in several cases expensive asphalt paint failed totally after two years' exposure. Concedes that there may be some preparations of iron oxide or secret preparations as good as red lead, but sees no reason for changing his practice.

L. J. LeConte agrees with Mr. Gerber. Believes that the reputation of iron oxide paint has been injured by adulteration. Graphite paints are making a good record in California and are likely to prove as reliable as iron oxide. Asphalt paints good for nothing.

N. W. Eayrs thinks Mr. Gerber was unable to get sufficient data on which to found conclusions. Tests made on the Merchants Bridge elevated structure at St. Louis proved that iron oxide and carbon paints (when pure) had about the same protective quality for metal but the carbon paints were tougher and more elastic.

The composition adopted by the Terminal Railway Association of St. Louis is, powdered charcoal, litharge and the best quality of boiled linseed oil with the addition of a little borax water. No turpentine or dryer is used. Carbon paint stands the heat from locomotive stacks better than any other kind.

G. Bouscaren denies Mr. Gerber's conclusions on the ground of want of evidence concerning the quality of red lead. Cleanliness of metal is of the first importance; then a shop covering of boiled linseed oil (raw oil remains sticky and gathers dirt) and structures so covered may remain several months after erection, before being painted. No painting should be done in wet or freezing weather. The pigment should be ground in boiled linseed oil before reaching the painter and those are the only two ingredients which should be used in a paint. All conditions favorable, iron oxide should last three years and red lead six years. A fresh coat should be applied to old paint before any rusting takes place for field cleaning can never be thoroughly done. Adulteration of iron oxide very common. Gets most uniform results also from red lead which is decidedly preferred.

Robert Moore expresses surprise that so far as experiment goes on Merchants Bridge at St. Louis, iron oxide is superior to red lead. If proper tool can be designed, recommends sand blast for field cleaning.

Corydon T. Purdy in a recent paper stated that iron oxide paint is not desirable, but will modify his views if

ably not useful as a pigment. Quality of oil very important: should be stored for two or three months. The old practice was to heat up to 400 deg. or 500 deg; now some dryer is added, and oil is said to be "boiled through the bung hole." The best boiled oil is not so good as the raw oil from which it was made, and a drier is deleterious in proportion to its quantity.

Mr. Sabin quotes instances to show the widespread adulteration of the materials used in paint:

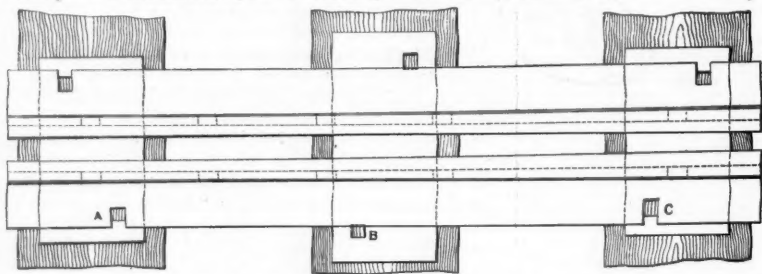
*Remixed Minimum Cost of One Gallon of Iron Oxide Paint.*

64 lbs. oxide.....	\$.065
64 " oil.....	.463
Labor in paint mixer.....	.125
Milling, etc.....	.04
Wear and tear.....	.0025
Barrels.....	.02
Delivery f. o. b. New York.....	.015
Superintendence, etc.....	.05
	\$.700

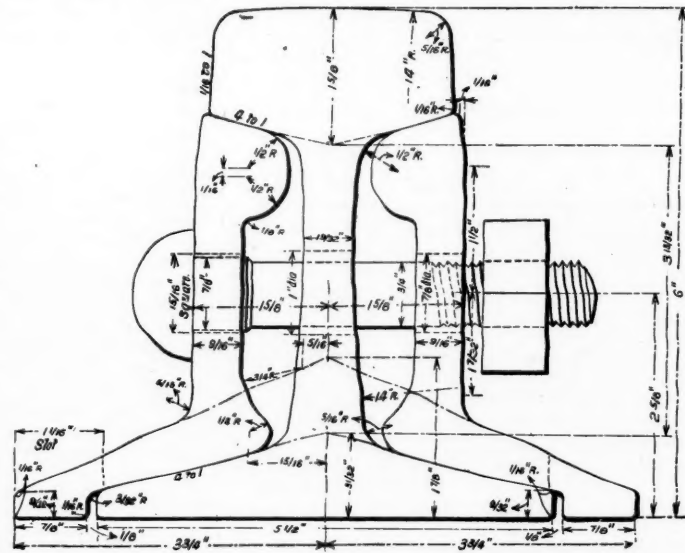
Red lead paint will cost from \$1.50 to \$2.00 per gallon. No honest paint can be made for less than the prices given. Condemns the use of coal tar.

The best asphaltum compound is composed of hard asphaltum, copal gum and linseed oil, thinned if necessary with pure turpentine. The oil must be very pure, and its non-drying constituents removed. In mixing (asphaltum?) varnish, the materials must not only be of the best and in the proper proportions, but the combinations must be made at certain temperatures, differing for different materials. Recommends the immersion of water pipe into an asphaltum varnish bath, and the baking of the varnished pipe for some hours in a temperature of 450 degs. to 500 degs. Fahr. Quotes a letter from E. Kuichling, giving a description of experiments tending to show the extreme permanency of this covering.

A. P. Bolter.—Since painting is left to contractors, the cheapest compound is chosen and manufacturers are therefore impelled to cheapen their mixtures. Engineers must dictate as to quality and the condition of the metal when the paint is applied. Painting out doors is not



Slotting of Concord & Montreal Standard Rail Joint.



Standard 100-lb. Rail and Joint—Concord & Montreal Railroad.

Mr. Gerber's conclusions can be sustained. Believes a good graphite paint the best for structural iron.

David N. Melvin abandoned red lead as a pigment 15 years ago and now uses iron oxide. Oil should be blown by bessemer process for several hours, and maintained at a temperature of 400 degs. to 500 degs. by which means the oil is boiled, and all mucilaginous matter is removed at the same time. All admixture of rosins, rosin oil or gums is injurious. In judging of oil, paint in several layers until a thick skin is formed. Best mixture with a tolerably viscous oil is equal proportions by weight of oil and pigment.

*Standard Pigment.*

	Per Cent.
Peroxide of iron.....	5.11
Carbonate of lime.....	0.27
Silica.....	16.03
Moisture.....	1.50

White lead has the least action upon linseed oil, and there is no other equally good substitute. Lithophone, is a German sulphide of zinc and barium; 3 tons per week is now used with about equal quantities of white lead. Covering powers of lead paints much overestimated out of the question with iron when cost is to be considered.

A. H. Sabin believes that the rusting of iron is promoted by electrical activity. There are three common forms:

- Magnetic oxide—Black— $\text{Fe}^2\text{O}_3$ .
- Anhydrous sesquioxide—Reddish Brown— $\text{Fe}^2\text{O}_3$ .
- Hydrated sesquioxide—Common forms of rust which always contain water, and sometimes carboxide, sulphur, phosphorus, etc., etc.

Almost all natural ores contain some hydrated oxide which is only partly removed by roasting. This form is harmful since it will conglomerate, and when in paint will promote the extension of rust. Hydrates of iron contain from 10 per cent. to 14 per cent. of water loosely combined, which will pass from one state of oxidation to another and carry oxygen. This is the common explanation of the progression of rust.

The addition of a lead compound to oil increases its rate of drying, but it is out less durable than pure raw oil. Red lead mixed with linseed oil "sets" quickly into a compact mass, and the difficulty of application is increased. White lead paint is the most perishable used by house painters. The brighter the color the more hydrates there usually are in iron oxide paints.

Difficult to grind graphite finely enough, and proba-

bad in dry summer weather, but a proper contact cannot be secured with damp or frost. The priming coat is the vital one and no reason is seen for the use of pure oil. Mr. Gerber himself demonstrates the necessity for a pigment. If economy is to be used on it on the subsequent coats, not on the priming. Abandoned the use of red lead for many reasons after having preferred it. Insists on oil grinding as being absolutely necessary to secure the best results. Paddle mixing is ineffective.

Emil Gerber concludes.—Emphasizes importance of clean metal. Shows that the area covered by a paint is not important since a great area means a thin film, which is not the object sought in painting metal.

One trouble on railroads is that the purchasing agent usually awards the contract to the lowest bidder.

Finally, believes that in the direction of carbons or mixtures with carbons a better paint will be found than in either iron oxides or lead compounds; that a slow drying paint is better than one which dries rapidly.

[TO BE CONTINUED.]

**Standard 100-lb. Rail of the Concord & Montreal Railroad.**

The Concord & Montreal Railroad has adopted a 100-lb. rail as standard, and will lay it from Nashua to Woodsville, 128 miles. The engravings show the section of the rail and of the standard joint, also the slotting of the angle plates. When Mr. Frank A. Merrill, Chief Engineer of the railroad, sent us the blue-prints of this rail and joint he was laying 2,800 tons rolled by the Lackawanna Iron & Steel Co., of Scranton, under the supervision of Mr. P. H. Dudley. The section of rail and the joint are Mr. Dudley's latest pattern, and are identical, we believe, with the present standard of the New York Central & Hudson River except in the matter of slotting the angle bars. In these the slots are made deeper on the Concord & Montreal, so that the spikes bear against the rail base and the plates are punched rights and lefts in order to place the spikes unsymmetrically to help keep the ties from slewing.

With this rail the Servis tie plate is used for every tie on curves and on the three joint ties on tangents, and no rail braces are used. The ties are spaced 30 in. center to center.

**The Pennock Steel Freight Car.**

A steel car has recently been built at the car works of Pennock Bros., at Minerva, O., for the Carnegie Steel Company, which has given satisfactory results in tests by that company at the Edgar Thompson works.

The car is made entirely of steel and malleable cast iron, the latter being used for struts and draft attachments. One of the illustrations is a view of the under side of the car, giving a fair general notion of the construction.

The entire body of the car is made of seven steel channels, running lengthwise of the car, with the two flanges of each channel extending downward, the webs of the seven channels forming the floor of the car. The webs of these channels are 14½ in. wide, and the flanges 8 in. deep. They are held together by ½-in. tie rods through the flanges just beneath the webs, as shown at A in the engraving, showing a section of the car at a cross-tie beam. Each rod also passes through malleable iron struts placed between the flanges of each channel. These struts support the webs of the channels at intervals, so that entire dependence is not placed upon the channel webs for the stiffness of the floor. The struts are shown in the sections of the bolsters and cross-tie beams, at B, the intermediate struts, which are merely arches, being shown on the half-tone view of the under side of the car body.

The two center channels or sills of the car body are strengthened by two T sections, EE, riveted to the flanges of the channels, as shown in the sectional view, extending the entire length of the car. To them are fixed the

malleable iron draft attachments. The inner flanges of these T sections are cut away for about 11 in. of their length to allow the draft springs and followers to be raised into position. A shoulder is thus formed, which serves as part of the abutment of the follower plates. The followers are secured by guides and bolts, which are shown in the view.

The bolsters are arranged to suit the Fox trucks with which the car is equipped. They are made by fitting a 1-in. plate, 10 in. wide, to the under side of the car body, which plate, shown at C in the bolster section, acts as a compression member. The tension member is formed of three 1½ in. rods, placed side by side, just under the car floor. The heads of these rods are shown in both half tone views.

The cross-tie beams, of which there are two, are formed of 6 in. I-beams, riveted across the bottoms of the struts and of the two T-sections in the center. A plate F, shown in the sectional view, finishes up the side of the car and also acts as a tension member, or truss rod.

The tests of this car made by the Carnegie Co. resulted as follows:

**PENNOCK CAR TEST BY THE CARNEGIE STEEL COMPANY, LIMITED.**

Date of test.....	July 12, 1895
Rated capacity.....	60,000 lbs.
Weight of car.....	22,620 lbs.
Material in load.....	4 x 4 Billets
Manner of application.....	Uniformly distributed
Weight of first load.....	59,880 lbs.
Effect on bolsters.....	Closed down 7/8
" center of car platform.....	Deflected 1/4
" outside edges platform.....	Deflected 1/4
Weight of second load.....	83,830 lbs.
Effect on center of platform.....	Deflected 3/8
" outside of platform.....	Deflected 1/2
Weight of third load.....	118,000 lbs.
Effect on center of platform.....	Deflected 1/2
" edge of platform.....	Deflected 3/4
Change after shifting.....	None
Permanent set after standing loaded 48 hours.....	None

It is thus seen that the car sustained 5.2 lbs. of load to one of car, and taking the body alone, which weighs 11,780 lbs., the load was over ten to one. In this test the car when loaded with 118,000 lbs. was coupled to a locomotive and rapidly shifted back and forth over a badly worn four-track crossing, without perceptible vibration of the car body.

The weight of the car is from 2,000 to 4,000 lbs. less than that of the wooden car usually constructed for and rated at 60,000 lbs. capacity. This reduction in weight is due to the lighter construction made possible by using the floor as a compression member, and by doing away

with braces or gusset plates to keep the body square. Another feature is the small number of parts, there being less than one quarter as many as in an ordinary wooden car.

The top of the floor is 3 ft. 8 in. from the top of the rail, being 6 in. lower than the average wooden car. The draft comes in direct line with the car body. The construction admits of easy access for painting, inspection,

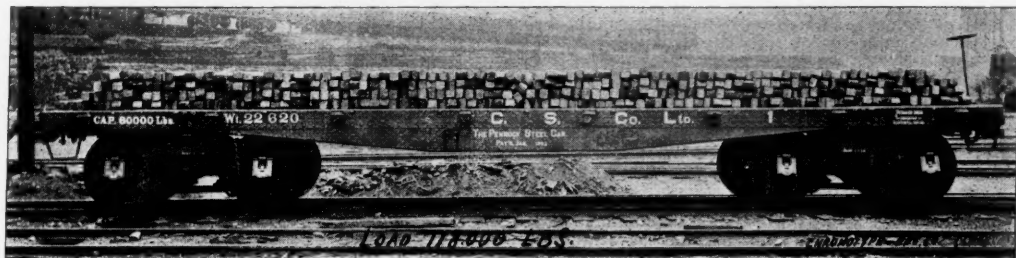
repairs is found in the host of cars now running over the country built for private companies, but apparently not maintained by the owner or anyone else.

Back of the proper care in equipping and inspection of the cars, there must, of course, be the proper design. It is a mistaken idea to think that all that is necessary is to follow on one car as nearly as possible what has proved satisfactory on another one, which is perhaps of different size and weight. Every class of car needs, and should have, air-brake connections and levers designed

by shrinkage of timber and consequent loosening of bolts. This defect, if not remedied, makes inefficient brakes, and is liable, when strong application of the brakes is made, to tear the cylinder from the car.

The existence of such glaring defects as I have mentioned, and many others of greater or less importance, shows the necessity for two important factors in a proper railroad air-brake outfit, namely, the providing of necessary tools to train crews and inspectors, and the establishing of well equipped air-brake testing plants at proper intervals on all lines. Every train crew should be provided with the necessary wrenches for tightening all union nuts and fittings in the air-brake system, and also proper sizes of pipe wrenches for holding pipe or tightening loose joints. A 15-in. monkey wrench and one No. 3 and one No. 4 alligator wrench will provide the necessary outfit in this connection, except for some cars having a union nut near strainer in main line, which is too large for the 15-in. monkey wrench. For these a plain steel wrench of proper size may be furnished.

With the rapidly increasing number of air-brake cars, well equipped testing plants become a necessity, but not, as some have supposed, for the purpose of enabling a receiving road to test and reject cars offered in interchange, because the air-brake apparatus is defective. The day for such expensive folly is fast disappearing. An air-brake testing plant is rather for the purpose of enabling a road to ascertain if all air-brake cars put into its trains are in a good state of efficiency. Where cars are not found so, such plants should provide means and men for making the necessary repairs, renewals, and adjustments, to bring the apparatus to its proper working order. A plant for air-brake testing should consist of a good boiler and one or more air-pumps, or a power compressor if the location is convenient to shafting from which power can be obtained. As a rule the boiler and pump will be found best, as they can be depended upon either day or night. The pump should connect with a suitable reservoir or storage tank, where a sufficient reserve of air at 90 or 100 lbs. pressure can be maintained to provide for frequent and extensive drafts on its capacity. There should be a standard engineer's valve in the piping between the reservoir and the yard pipe line. One and a half inch galvanized pipe should be laid between all air-brake inspection tracks, so that one line of pipe can provide for two tracks. At frequent intervals, say every 35 ft., a suitable provision



The Pennock Steel Freight Car, Loaded For Testing.

etc. No holes are required through either the floor or the flanges of the tension members *EE* and *FF* (where they are in tension) for bolts, rivets, or king bolt, any of which may be removed when the car is loaded without disturbing the load. In uniting the various parts of the car, care is taken to have the connection at least 100 per cent. stiffer than the parts connected, so that all spring or torsion is taken up in the body of the member.

The estimated capacity of this car body at one-half of the elastic limit of the steel is 104,000 lbs. and at the elastic limit 208,000 lbs., with load evenly distributed. Therefore a load of 60,000 lbs. is less than 30 per cent. and one of 80,000 lbs. less than 39 per cent. of the elastic limit, which allows a liberal margin in either case.

The car is equipped with hand brakes, and provision is made for the attachment of air-brake cylinders, pipes, levers, etc., with but few additional parts.

It is claimed by the builders that the cost of maintenance of this car, leaving out of account in each wheels, axles, journal bearings and couplers, will be less than 25 per cent. of the average cost of wood cars now in service.

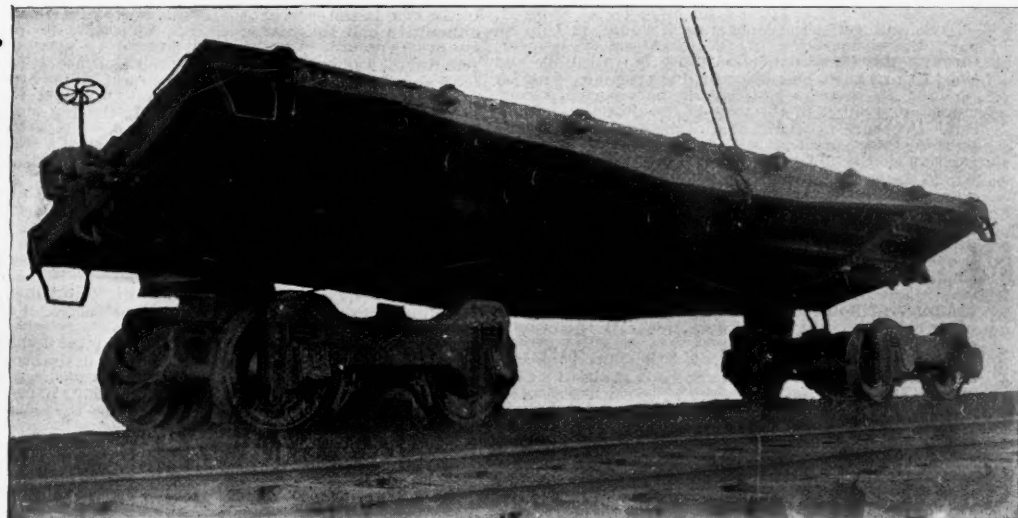
#### Air Brakes on Freight Trains.\*

By A. M. WAITT, General Master Car Builder, Lake Shore & Michigan Southern Railway.

With the equipping of large numbers of cars with automatic brakes has come a new and unlooked-for danger, which is even now not recognized by many roads, but which careful inquiry and investigation on some of our largest lines has shown to exist to an alarming extent. The cars equipped with air are switched to the front, and these few cars are depended upon to do the work of stopping the entire train. If no serious leak or break in pipes occurs and no hose bursts, and if no emergency application is required, all may go well; but if either of the above conditions exists, then trouble in serious proportions may be looked for. The sudden exhaust of air from the main train pipe on the five or ten air-brake cars forward gives the emergency application on these cars, and the oftentimes larger and heavier portion of the train in the rear, piles up promiscuously on to and over the front cars. Trains partially equipped with air, or having enough air-brake cars to control them without the use of hand brakes (which is all that the law requires), are an invitation to more serious accidents, and in larger numbers, than were ever likely under the old regime, where hand brakes were the sole dependence. Our only hope of freedom from wrecks and injury to employees, freight and cars, is to carefully study the conditions necessary to safe running and the elements causing the accidents which have so frequently occurred.

It is a recognized fact that at the present time a large percentage of the air-brake freight cars of the country are not in first-class condition; but few companies have paid much attention in the past to their air-brake cars. It is a most common occurrence to find newly-built cars with leaky joints in the main train pipe or the branch pipes, or with the hose nipples screwed into the angle cock casting so as to hold by only two or three threads, or with air cylinders so located as to prevent removal of front head for oiling and cleaning, or with

brake mechanism. Judging from experience at air-brake inspection plants, this work is sadly neglected. It frequently occurs that cars are found with the cylinders a perfect bed of rust inside, and with the piston packing so hard and dry that they might as well have been in the scrap pile, as far as any good to be obtained from them, for the air will blow by the packing ring without moving the piston. On the other hand, sometimes we find cylinders well oiled, but with the triple valve all gummed up, showing either lack of any cleaning or else, as was once seen by the writer the triple had been partially taken apart and then oiled by injecting a syringe full of black oil into such parts as could be reached, with the result that the accumulation of oil soon collected a goodly amount of dust as it passed through the triple mixed with air, and soon the triple was unfit for anything. Mr. Rhodes has, in a paper before this Club in January, 1894, shown very clearly the results of neglect to properly inspect and clean strainers.



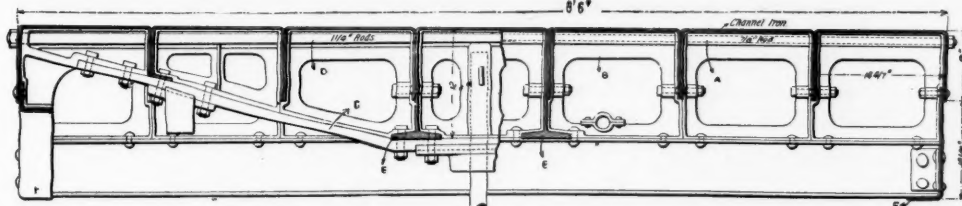
The Pennock Steel Freight Car, Showing Construction of Car Body.

should be made for hose connection from the yard line to cars. In large yards where there are several thousand feet of pipe, the pipe system will be found to provide a considerable part of the necessary storage capacity. When an air-brake train is made up at either terminal of a road, all the air cars should be placed on the test tracks and the apparatus on the cars should be individually examined, as to their general condition, efficiency and adjustment.

No car should be allowed to proceed in a train until it has the air-brakes in good working order. Cars thus tested should be marked or carded in some way, so that all persons on the road in question may know when and where the test was made. When arriving at the next test plant, cars marked showing that they have had a previous test and attention, on same line within ten days, should be passed without further attention, unless they need renewal of brake shoes, or unless some defect in air-brake apparatus has developed while in transit. All cars taken on trains between test stations, and all cars not marked to show a previous recent test on same road, should be placed on test tracks and properly cared for. It is the writer's opinion that, for some time to come, it will be wise for each road to make its own air tests, not depending upon the marks indicating the date of previous tests on some other line. I believe that any road carrying out the plan above outlined will have its freight train air-brakes in a state of efficiency not far removed from the average passenger trains.

In addition to knowing that the apparatus is in good condition, it is even fully as essential that the employees know how to use the brakes properly when needed. Every railroad company should have either an air-brake instruction car or an air-brake school at some convenient point. Every employee connected with train service, in its movement or repairs, should be instructed and should pass a satisfactory examination regarding all the parts of the air-brake apparatus that may in any way concern them. Such instruction is still only a partial step toward accomplishing the desired end. It is frequently found that an engineer or trainman, who seems to be perfectly conversant with the manipulation of the brakes in the air-brake school, is totally unable to carry the precepts and principles taught into actual practice on a train. And many a company which has been putting forth faithful efforts to instruct its men in the use of the air-brake has found to its chagrin that the employees did not make the improvement that might have been expected. After the air-brake school training the instructor must follow up his pupils on the engine and train, and in the repair yard and shop.

Perhaps there is no part of the air-brake system more neglected, and at the same time more important, than the hose, with their couplings. A neglected inspection and renewal of this seemingly insignificant part, has been the direct cause of more wrecks and loss of property



Section at Bolster.

Section at Cross-tie Beam

Transverse Sections of Pennock Steel Platform Car.

the pipe clamps merely acting as a loose support for pipes, instead of holding them tight in their place, thereby preventing rattling and consequent tendency to leaking joints. It is also frequently found that the strainer is filled up with scale and greasy dirt, showing that the pipes have not been blown out with steam before putting up, and that care has not been taken to prevent the use of white or red lead in considerable quantities in making joints. It is also frequently found that a triple case or a hose coupling is discovered with sand holes, showing not only carelessness of inspection on the part of the manufacturers of the air-brake apparatus, but an apparent lack of proper inspection when brakes were being tested in the shops, before the cars were put into service. Especial trouble in these

A growing evil from lack of proper instruction and discipline is the large number of torn hose and defective gaskets, caused by failure of trainmen to uncouple hose by hand when cars are cut apart. The air hose are not intended to stand such abuse, and every company should require a rigid adherence to the rule that "all air hose must be separated by hand, and then be properly hung up in the dummy coupling." A violation should be severely dealt with. It frequently happens that inspectors and trainmen attempt to make needed repairs to the air-brake apparatus, without having a proper understanding of the construction of the parts, or the proper way of doing the work, and perhaps more often without having the proper tools to do the work. Trouble will surely ensue from such conditions. As a result of the use of green lumber in construction, it is a frequent occurrence to find cylinders and reservoirs loose and down from an  $\frac{1}{4}$  to  $\frac{1}{2}$  in., caused

\* Abstract of a paper read at the November meeting of the Western Railway Club.

on freight trains on many of our large trunk lines, during two years or more past, than any other cause or causes. This is a strong statement to make, but is one that is borne out by facts. I admit that if the average Superintendent Motive Power or Master Car Builder is asked whether they experience any annoyance in this respect, they will invariably reply that they have but little trouble from burst hose.

During the past four months it has been the writer's privilege to examine many hundreds of burst and worn air-brake hose, and to investigate into the causes of some of the wrecks occurring on the lines of several roads. As a result of this work, the vital importance of careful inspection and maintenance of air hose has been impressed upon my mind in a way which will not soon be forgotten. I doubt much if there are many railroads to-day who are giving this feature even a small portion of the attention it deserves. The experience on the L. S. & M. S. Ry. surely is no exception to the general rule, and if, with ordinarily careful inspection, and well-instructed engineers, and properly equipped locomotives, we have had air hose burst in trains, by fifties in a month, it is reasonably safe to assume that other companies are having a somewhat similar experience.



Map Showing Location of the Cernavoda Bridge over the Danube.

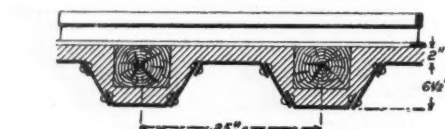
In order to get at the exact state of things in this regard, the co-operation of the operating department, through the superintendents, must be called in, and every case of burst hose discovered by trainmen, whether repaired by them or not, should be reported, accompanied, if possible, in all cases, by the defective hose itself. I venture to predict that if general investigation on these lines is made, it will develop a state of things existing that is now little dreamed of. On the road with which the writer is connected, it disclosed the fact that we were allowing thousands of air hose to run on our own and foreign cars that careful inspection would clearly show as unsafe to be relied upon under 70 pounds pressure for any length of time.

The question arises, "What can we do to remedy this condition of things?" It is first necessary to enforce a careful and rigid inspection of all air hose. A careful examination will show whether the hose is old, with the outer rubber coating full of deep cracks; it will show if the hose has been kinked and has the outer rubber cracked, exposing the canvas; it will show, if the hose is dated, whether it has outlived its safe life limit; it will show if the hose is cut or is badly chafed, exposing the canvas. All of the above defects are dangerous and render a hose likely soon to fail by bursting. Some lessons here may be learned from the hose manufacturers. I am told that the safety of a hose depends upon keeping moisture away from the canvas or duck which forms an important part in its manufacture. As soon as water reaches this canvas, either from the inside or outside, it will work its way along, separating the rubber from its canvas foundation and at the first minute opening working through to the next course of canvas, and so on until the strength of the hose is so reduced that the 70 lbs. pressure which is almost constantly on it forces its way through, perhaps causing a bad wreck.

All this may come from an exposure of the canvas in a hose, which might have been seen by proper inspection. All air hose should be ordered with ends capped. This capping is a thin ring of rubber which is made up in the hose, and which effectually covers and seals the canvas at each end of the hose and keeps out all moisture.

Manufacturers will only guarantee the best air hose for from two to two and a half years' life in freight service. A careful record kept by the L. S. & M. S. Ry. for the past two years shows the highest average life of dated hose removed from its own and from foreign cars as 25 months; in a few instances one make of hose showed a life of over 36 months. If the makers can only guar-

antee 30 months at the outside, and as a hose failing on a train in service means such danger, can we afford to permit hose to continue running till they burst, regardless of their age? I believe that good practice will warrant the removal and condemning of most air hose which have been in service over thirty months, and such is the practice on the road with which I am connected. This renewal is made on both domestic and foreign cars.



Floor Construction—Danube Bridge.

The feature of removal of hose, when they have given a fair length of service, necessitates a provision by the manufacturers for marking all air hose furnished by them in a clear and permanent manner, the marks being so located, and of such size and color, as to be easily read by car inspectors. Such markings should include: 1st, the maker's trade mark; 2d, initials or trade mark of railroad for whom the hose is made; 3d, mark showing date of manufacture (month and year); 4th, removable date marks for showing when hose is applied and removed; 5th, time guarantee mark. Having all hose properly marked and dated when first applied, it becomes greatly to the interest of every railroad to keep a careful record of all hose removed from its own and foreign cars, such record giving full particulars as to maker's name, date of manufacture, guarantee, date of application and removal, together with cause of removal; from such record of the hose removed, a proper check can be made on each manufacturer, and in a few years' time, it will be seen which manufacturers make good hose, and which poor ones.

newing hose, so as to leave little or no risk of a hose bursting on the road with its too frequent attendant danger of a serious wreck.

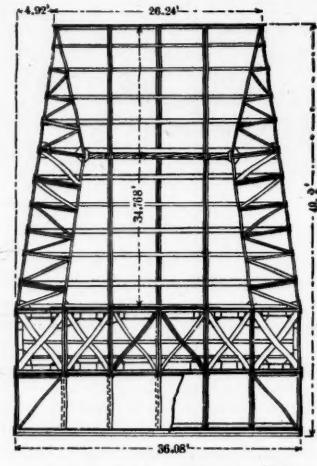
#### The Bridge Over the Danube at Cernavoda.

The King and Queen of Roumania, opened to traffic on Sept. 26, a bridge over the Danube, which closes the gap in the shortest route from the Baltic to the Black Sea. It also forms a link between Roumania proper and the Dobrudsha, which was ceded to Roumania by Turkey after the Russo-Turkish war of 1877. The Black Sea harbor Kustendji in the Dobrudsha—(which in Lippincott's Gazetteer of 1893 is described as "exposed and ill adapted for large ships")—is connected by railroad, with Cernavoda on the Danube, just across from Fetteshti which is on the railroad to Bucharest, the capital of Roumania. Kustendji being the objective point, the given location for the bridge was on the line Fetteshti-Cernavoda, although the river at that point is not well adapted for a crossing being separated into a north branch, the Borcea, 1,500 ft. wide, and the Danube proper, 2,500 ft. wide, by the Balta Island, a swamp 7.5

miles wide, rising about 6 ft. above zero level and inundated in freshets to a depth varying from 6.5 ft. to 16 ft.

The connecting line starts at Fetteshti, 17 miles from Cernavoda in a cut into the plateau of the Roumanian plains, which increases in depth as the river is approached and reaches the river with subgrade 65 ft. above zero level. The Borcea bridge is 1,378 ft. long, three spans and girders of the same design and dimensions as those of the main bridge discussed below: one central cantilever and two half parabolic girders suspended at one end.

The Balta Island is crossed on an embankment, built on concrete between rubble walls with a down grade



Section of Caisson—Danube Bridge.

from the bridge to the Balta Viaduct, near the middle of the island, 4,773 ft. long, 34 spans, and rising only 10 ft. above high water. Thence there is an up grade to a viaduct of 15 spans, 3,000 ft. long, which leads to the main bridge across the Danube. The river at zero level has an average depth of water at this point of 33 ft. and is 2,000 ft. wide. High water rises 23 ft. above zero level. The borings revealed limestone 102 ft. below zero level, rising abruptly on the right bank but only slightly on the island side. The rock is overlaid with quicksand with occasional gravel pockets and clay seams.

The preliminary work and projecting of this bridge occupied the time from 1880 to 1890. In 1883 eight foreign firms were invited to compete for prizes for the best design. Two prizes were awarded, but none of the designs accepted. They served, however, as a basis of specifications for a new competition between the same firms in 1886. The main points were these: 1. Continuous girders and arches are not wanted. 2. The lowest point of the superstructure is to be 98.5 ft. above high water for the entire width of the bridge, the channel shifting. 3. Piers to be sunk to bedrock, and pressure on the latter not to exceed 142.23 lbs. per square inch. 4. Spans not less than 541 ft. 5. Steel preferable to iron for the superstructure. 6. Wind pressure, 37 lbs. per square foot for the loaded and 55 lbs. per square foot for the empty bridge.

Only five French firms responded to the invitation. The projects were again rejected. The Government endeavored to obtain and got opinions on the latest achievements in bridge designing and constructing from French, German and Austrian engineering bodies, the result of which was the selection of mild steel as material for the superstructure, and of the cantilever form for the design for same. The final project was worked out under the direction of Mr. Saligny, Chief Engineer of the Roumanian State Railroads.

The foundation of the piers was effected partly from built and partly from floating structures. The caissons



The Bridge Over the Danube at Cernavoda.

were erected ashore during the winter, and towed to place after the erection and safe anchorage of the floating scaffold. The impossibility of suspending the caisson in the great depth of water necessitated the employment of a high and strongly-braced metal coffer over the same, as shown in the section of the caisson. When bedrock was reached a water column of 102 ft. had to be carried. Several deaths occurred in the air locks, in spite of all precautions.

The bridge is anchored on the two center piers, and expands on pendulum supports over the four others.

The steel superstructure consists of two main girders 788 ft. long, supported by two piers each 164 ft. from each end. Half parabolic girders, 295 ft. long, are suspended between the spans and from their free ends to the abutments. Thus five spans are formed: a center span of 623 ft., and four side spans of 460 ft. each from center to center of piers. The cantilevers are inclined 1:10 toward a vertical plane through the longitudinal axis of the bridge, and the bottom chords are not parallel, but their distance decreases from 29.529 ft. between centers of gravity over the piers to 21.3265 ft. at the ends of the brackets; the

latter figure is also the distance center to center of chords of the suspended girders.

The end posts of the suspended girders rest on the lower chords of the brackets on roller bearings and the lateral stresses are taken up by vertical pins which join the box shaped end floor beams.

The floor has an entirely closed metal covering (shown in the engraving) on which wooden ties rest in asphalt concrete.

The erection of the superstructure was a difficult problem. The following scheme worked successfully. The two main girders were erected on trestles just above high water. Thence they had to be lifted 98.5 ft. For

1895. In driving through the Maryland counties to inspect possible routes and in conversation with the thrifty farmers of the Eastern Shore, it was soon discovered that their minds were bent on a steam railroad, which would enable them to send their products to market in Baltimore in much less time than is now possible. The fact also suggested itself that Baltimore now has no direct communication with the seashore, and the project grew by degrees into an undertaking of much greater magnitude than was at first contemplated.

The company was reorganized last spring; capital was subscribed to the amount of \$800,000; an enabling act and right of way were voted by the Delaware Legisla-

work train ran over a misplaced switch and into some cars standing on a side track, making a bad wreck. Six employees were injured, two of them fatally. It is said that the switch had been maliciously misplaced.

18th, on Grand Rapids & Indiana, at Ceylon, Ind., a pay car train ran over a misplaced switch and into some cars standing on a side track, making a bad wreck. Three employees were killed and several others were injured.

20th, on Baltimore & Ohio Southwestern, at Bond Hill, O., a freight train drawn by two engines ran into the rear of a preceding freight, making a bad wreck. One engineer was killed and both firemen were injured.

21st, on Grand Rapids & Indiana, at Portland, Ind., a freight train descending a grade broke in two and the rear portion afterward ran into the forward one, wrecking 15 cars. A boy was killed.

22d, on Wabash road, at Martinsburg, Mo., a local freight train standing at the station was run into at the rear by a following freight, making a bad wreck, and moving the station building off its foundation. Two men were killed and 3 injured.

22d, on New York, New Haven & Hartford, at East Greenwich, R. I., a freight train which had been stopped on account of the breakage of a coupling, was run into by a following freight and 5 cars were wrecked. The engineman of the latter train disregarded a fixed danger signal.

24th, 5:30 p. m., on New York, New Haven & Hartford, at Hyde Park, Mass., an eastbound local passenger train, standing at the station, was run into at the rear by a following express train, and the rear car of the foremost train was wrecked. The rear brakeman and one passenger were killed and 20 passengers were injured. The tail lights of the foremost train were burning brightly and there was a clear view back for a long distance. There were also automatic electric block signals. The brakeman, who had been on this train but a few days, did not go back with a red signal, his train not being behind time. It is said that the block signals were working properly, but this statement is disputed by the friends of the engineman. The State Railroad Commissioners have investigated the case, but have not yet made a report.

25th, on Baltimore & Potomac, at Bowie, Md., a stock train standing on a side track was run into at the rear by a work train, making a bad wreck. One drover was killed and 3 drovers and 1 employee were injured.

25th, on Pittsburgh, Fort Wayne & Chicago, near Leetonia, O., a freight train broke in two and the rear portion afterward ran into the forward one, wrecking 3 cars. A tramp was killed.

26th, 6 a. m., on Florida, Central & Peninsular, near Williston, Fla., a passenger train standing at a water tank was run into at the rear by a Savannah, Florida & Western passenger train, wrecking 2 cars. One passenger was injured.

27th, night, on Columbus, Hocking Valley & Toledo, near Delaware, O., a freight train broke apart in two places and the detached portions afterward ran together. Six cars were derailed and fell down a bank and a tramp in one of them was killed.

29th, on West Jersey, near Franklinville, N. J., a freight train broke in two and the two portions after colliding, making a bad wreck. The conductor was injured.

29th, on Wisconsin Central, at Mellen, Wis., a freight train ran into the rear of a preceding freight and the caboose was wrecked and set afire. The conductor, who was unable to escape, was burned to death.

And 11 others on 10 roads, involving 1 passenger train and 19 freight and other trains.

#### BUTTING.

5th, on Atlanta & West Point, at Red Oak, Ga., butting collision between passenger trains No. 35, south bound, and No. 12, north bound, wrecking both engines and badly damaging several cars. One engineman was killed and a mail clerk injured. The engineman of No. 35 forgot a telegraphic order. The conductor noticed the error as the train passed the meeting point, and signaled the engineman to stop, but not quite soon enough.

12th, on Knoxville & Ohio, at Powell, Tenn., butting collision of passenger trains, badly damaging both engines and several cars. Three trainmen and 3 passengers were injured.

16th, on Pennsylvania road, near Altoona, Pa., butting collision between a passenger train and a water train, wrecking both engines. The collision was violent and all of the passengers were more or less injured. Both enginemen and one fireman were fatally injured. There was a dense fog at the time. The engineman of the water train is said to have thought that the passenger train had passed when it had not.

29th, night, on Missouri Pacific, near St. Louis, Mo., butting collision of passenger trains, both running at considerable speed, making a bad wreck. Both enginemen and one fireman were killed and the other fireman, 2 other trainmen and 8 passengers were injured. The double track line at this point was undergoing repairs and the trains were running on a temporary track; a switch tender admitted the westbound train to the eastbound temporary track by mistake and the engineman did not notice the error until he had run some distance beyond the switch, and it was too late to avert the collision.

And 6 others on 6 roads, involving 1 passenger train and 11 freight trains.

#### CROSSING AND MISCELLANEOUS.

8th, on Philadelphia & Reading, at Aramingo, Pa., collision between a coal train and an empty engine. Two employees were scalded.

9th, 11 p. m., at St. Louis, Mo., collision between a locomotive of the Wabash road and a passenger train of the Missouri Pacific, in consequence of a misplaced switch. Several passengers were injured.

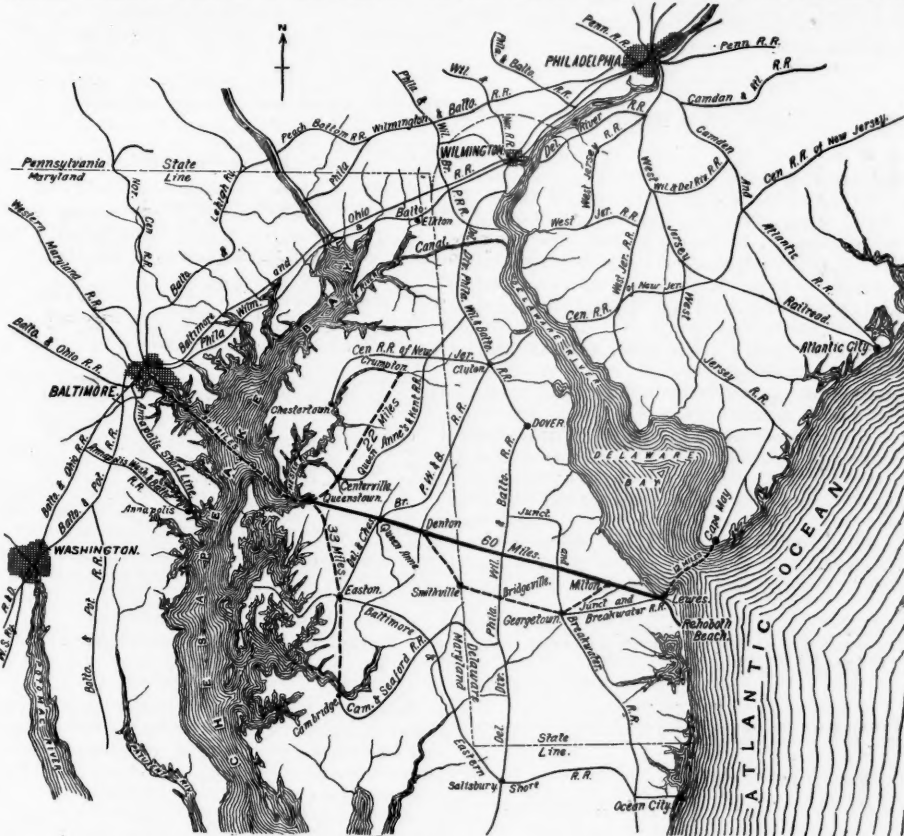
12th, 2 a. m., on Southern Railway, near Avondale, Ala., a passenger train ran into some freight cars which had been left on the main track without leave, and the engine and first two cars were damaged. The fireman and one passenger were injured.

14th, on Philadelphia & Reading, near Mount Hope, Pa., a freight train was cut in two at the foot of a steep grade and the forward part went on, leaving the rear portion standing on the main track; it had not gone far before several cars broke loose and ran back into the standing part and 20 cars were wrecked. A tramp was injured.

14th, on Minneapolis, St. Paul & Sault Ste. Marie, near Manistique, Mich., collision of freight trains, fatally injuring one employee.

21st, on Baltimore & Ohio Southwestern, near Fritchton, Ind., a passenger train ran into a freight train, making a bad wreck. One engineman was fatally injured.

24th, on Chicago, Rock Island & Pacific, at Valley Junction, Ia., a passenger train collided with a switch engine, and both engines were badly damaged. One passenger was killed and 1 passenger and 3 trainmen were injured.



Map of Part of Maryland and Delaware, Showing Location of the Queen Anne's Railroad.

this purpose the girders were put over the piers on hydraulic presses, these in turn resting on iron pipes which were imbedded in the masonry. There were two couples of such pipes in each pier one couple sustaining the load while the other couple was lengthened. The end floor beams were laterally extended and supported on wooden blocking during the shifting of the load from one couple to the other. Each pipe had to carry 380 tons. They were afterwards filled up with concrete.

The contract was let in 1890 to the French bridge works of Fives-Lille and completed within the stipulated time. Said company was the lowest bidder for the main bridge with 7,837,278 francs, or about \$1,567,456.

The bids ranged from that figure up to 17,008,755 francs.

The above is compiled from publications in the Austrian *Eisenbahn Zeitung* and the *Zeitschrift* of the Austrian Society of Architects and Civil Engineers.

#### The Queen Anne's Railroad.

What is known as the Queen Anne's Railroad is building across the Maryland-Delaware peninsula from Queenstown to Lewes. The first section of the road from Queenstown to Denton is being graded by W. C. Merritt, of Easton, Pa., and the eastern section is being surveyed by a party of engineers under the direction of Chief Engineer J. W. Troxel. Terminal facilities at Queenstown, consisting of a pier, train sheds and warehouses, are building, and it is expected that the western division of the road will be completed next spring, and that the eastern division will be graded during the summer months of 1896.

The present plans of the Queen Anne's Railroad Company contemplate an "air line" across the peninsula 60 miles in length, and between Baltimore and Queenstown, 30 miles, steamers will be run connecting with the railroad at Queenstown. From this point also a branch line is proposed 23 miles long, through Centerville northward to Crumpton on the Chester River. Another branch 33 miles long, running southward from Queenstown, will pass through Easton to Cambridge, in Dorchester County.

The project of building the Queen Anne's Railroad dates back to the early part of 1894. In that year several Baltimore capitalists, including Robert C. Davidson, president of the Baltimore Trust & Guarantee Company; Messrs. Middendorf, Oliver & Co., bankers; William H. Bosley and John S. Gittings, bankers; Bartlett S. Johnson and others formed a stock company and secured an act from the Maryland Legislature granting a right to build a railroad connecting several of the county seats and larger towns of the eastern shore of Maryland. It was proposed then to build electric railroads and that view of the enterprise did not change until the spring of

ture; and during the summer arrangements were completed to build a railroad from the Chesapeake Bay to the Atlantic Ocean, with branches and with terminal facilities of sufficient capacity to accommodate a large traffic. A construction company was organized July 31, of which Douglas Gordon is president, and contracts for constructing the pier at Queenstown and the western section of the railroad were awarded on August 20.

The chief consideration in building this railroad is the short route it will establish between Washington or Baltimore and the seashore. When it goes into operation these two cities will be 135 miles and 90 miles respectively from the beach. Under present arrangements it is impossible for Baltimoreans to visit the seashore either at Cape May or Ocean City, without spending a night on the way or in some hotel on the shore; but by means of this shortened route excursions could leave Washington or Baltimore in the morning, could reach the shore at Rehoboth Beach before 10 o'clock, and could go home in the evening. By a short sail of 13 miles it would be possible also to visit Cape May, going and returning the same day. It will be seen, therefore, that the Queen Anne's Railroad has in view the same end with reference to Baltimore that the Camden & Atlantic Railroad or the West Jersey line have accomplished for Philadelphia.

#### Train Accidents in the United States in October.

##### COLLISIONS.

##### REAR.

8th, on Pennsylvania road, at Mt. Pleasant, Pa., a passenger train ran over a misplaced switch and into some freight cars standing on the side track. A brakeman who jumped off was fatally injured, and 3 passengers were hurt.

10th, 11 p. m., on Philadelphia & Reading, near Auburn, Pa., a freight train ran into the rear of a preceding freight, wrecking engine and 20 cars. The fireman, who had gone back to apply brakes on the cars, was killed.

10th, on Philadelphia, Wilmington & Baltimore, at Bellevue, Del., a freight train descending a grade broke apart in two places and the detached portions afterward ran together, wrecking 3 cars. Two tramps were badly injured.

12th, 3 a. m., on New York Central & Hudson River, at Fonda, N. Y., a freight train ran into the rear of a preceding freight, badly damaging the engine and four cars, including 3 cars of rails. Some of the rails fell upon track No. 2 and derailed a passenger train.

17th, on Southern Pacific, near Davisville, Cal., a gravel train broke in two and the forward portion being quickly stopped by the automatic application of the air-brakes, the rear portion ran into it, making a bad wreck. A tramp was killed.

17th, on St. Louis, Chicago & St. Paul, near East St. Louis, Ill., a passenger train ran over a misplaced switch and into some cars standing on a side track, badly damaging the engine and several cars. The engineman was killed and another trainman was injured.

17th, on Long Island road, near Amagansett, N. Y., a

28th, on Lehigh Valley road, at Easton, Pa., collision of freight trains, wrecking both engines and several cars. One brakeman was killed.

30th, 5 a. m., on Burlington, Cedar Rapids & Northern, at Hardy, Ia., a westbound passenger train ran into an eastbound freight train which was entering a side track, wrecking the caboose and overturning the engine; freight conductor and passenger engineman killed and fireman injured.

30th, on Boston & Maine, at South Lawrence, Mass., a special train carrying officers of the road collided with a freight train, and several cars of coal fell down a bank. A brakeman was injured.

And 10 others on 9 roads, involving 1 passenger train and 19 freight and other trains.

#### DERAILMENTS.

##### DEFECTS OF ROAD.

14th, on Norfolk & Western, near Elkhorn, W. Va., a passenger train was derailed by a broken frog, and the first 3 cars were derailed. One trainman and several passengers were injured.

24th, 11 p. m., on Florida, Central & Peninsular, near Savannah, Ga., a freight train ran upon a burning trestle and 14 cars fell through and were wrecked. The wrecked cars took fire and with the bridge were burned up. Two trainmen were injured.

26th, on Chicago & Grand Trunk, near South Bend, Ind., a passenger train broke through a trestle which had been weakened by fire, and the engine, 3 baggage cars and 4 passenger cars were wrecked and the whole were burned up. Six trainmen and 3 passengers were injured. It is said that the engineman failed to discover the fire on the bridge on account of the dense smoke which filled the atmosphere.

30th, on Fort Worth & Denver City, near Chillicothe, Tex., a freight train was derailed by spreading of rails and 8 cars were wrecked; conductor and brakeman injured.

31st, on Philadelphia & Reading, near Mertztown, Pa., a passenger train was derailed by a broken rail, and 3 passenger cars were overturned. Four passengers were injured.

And 3 others on 3 roads, involving 1 passenger train and 2 freight trains.

##### DEFECTS OF EQUIPMENT.

13th, on New England road, at Waterbury, Conn., a freight train was derailed by a brakebeam which broke and fell upon the track, and 10 cars were wrecked. Three men in charge of horses were injured.

24th, 2 a. m., on Pennsylvania road, near Bailey's, Pa., an eastbound freight train was derailed by a broken axle, and 3 cars were wrecked. The wreck fell upon the adjoining main track and a westbound fast mail train was derailed and ditched. The engine of the main train fell into the canal, and 4 mail cars took fire and were burned up. The engine man and fireman of the mail were killed, and 8 clerks were injured.

And 9 others on 8 roads, involving 2 passenger and 7 freight trains.

##### NEGLIGENCE IN OPERATING.

5th, on New York, New Haven & Hartford, near Blackstone Junction, Mass., a freight train running south on the west track ran over a misplaced switch and into a turn-table pit, wrecking the engine and 9 cars. The engineman and one brakeman were killed, and 2 trainmen and a man in charge of horses were injured. The switch which was misplaced had been a trailing point. The west track being used for northbound trains, but the recent change, by which trains run on the right hand track, made it a facing point, with no distant signal.

15th, on Western New York & Pennsylvania, at Bradford, Pa., a freight train was derailed and the engine and 11 cars were wrecked. The fireman was killed and 2 other trainmen injured. It is said that the derailment was due to a misplaced switch.

And 7 others on 6 roads, involving 2 passenger and 6 freight and other trains.

##### UNFORESEEN OBSTRUCTIONS.

3d, on International & Great Northern, at Hulen, Tex., a passenger train was derailed by running over a cow, and the engine was overturned. The engineer was killed and 3 trainmen and 5 passengers were injured.

11th, on Louisville, New Albany & Chicago, near Francisville, Ind., a freight train was derailed by running over a horse, and the engineman was fatally injured. Two brakemen were hurt.

20th, on New York, New Haven & Hartford, near Cannon, Conn., a wrecking train was derailed by running over a horse, and several trainmen were injured.

23d, 3 a. m., on Norfolk & Western, near Wytheville, Va., a freight train was derailed by running over some cattle which were asleep on the track, and the engine and 3 cars were wrecked. The engineman, fireman and front brakeman were instantly killed and there is no survivor who saw the derailment.

And 6 others on 6 roads, involving 1 passenger train, and 5 freight trains.

##### UNEXPLAINED.

7th, on Chicago, Rock Island & Pacific, near Bethune, Col., a freight train was derailed and wrecked. The engineman was killed and two other trainmen were injured.

8th, on Union Pacific, at Omaha, Neb., a locomotive was derailed and fell down a bank; engineer and fireman killed.

8th, on New York, Chicago & St. Louis, at Ripley, N. Y., some cars being pulled out of a side track were derailed and overturned, and a freight loader inside of one of them was killed.

9th, on Pennsylvania road, at Manor, Pa., passenger train No. 13 was derailed at a switch while running at high speed, and two passenger cars were wrecked. The conductor of a freight train who stood on the ground near by was killed, and 25 passengers were injured.

11th, 5 a. m., on Southern Pacific, near Saugus, Cal., passenger train No. 19 was derailed on a sharp curve, and the fireman and mail clerk were injured.

13th, on Colorado Midland, near Florissant, Col., the engine of a freight train was derailed and ditched, and the engineer and fireman were injured.

18th, on Louisville & Nashville, at Berea, Ky., a work train was derailed and two employees were killed.

24th, on Tuscarora Valley Railroad, near East Waterford, Pa., an empty engine running backward, was derailed; the fireman was killed and the engineer fatally injured.

24th, 7 p. m., on Kansas City, St. Joseph & Council Bluffs, at Waldron, Mo., a passenger train was derailed while running at high speed, and the first 4 cars were wrecked. Ten passengers were injured.

31st, on Southern Pacific, near Maxon, Tex., a pay car train was derailed and ditched; fireman killed, engineer fatally injured.

And 16 others on 14 roads, involving 2 passenger and 15 freight and other trains.

#### OTHER ACCIDENTS.

5th, on Pennsylvania road, near Robinvale, N. J., the cab of the locomotive of a passenger train was badly damaged by a timber projecting from a car in a freight train passing on the adjoining track. The fireman was badly injured.

8th, on Philadelphia & Reading, near Wernersville, Pa., the locomotive of a freight train was badly damaged by an explosion due to the rupture of the crown sheet. The fireman, who was on the tender, was blown off into the ditch.

30th, on Union Pacific, near Wyuta, Utah, the engine of a freight train was badly damaged by the breaking of the main driving wheel axle. The air pump was wrecked and the engineman was unable to apply the brakes. A brakeman jumped off the engine and was injured.

And 4 others on 4 roads, involving 3 passenger trains and 1 freight.

A summary will be found on another page.

#### Tests of Car Wheels.

Three weeks ago (Nov. 8, p. 744) we told of some tests of special car wheels made in Buffalo at the New York Car Wheel Works. We can now publish the results. The tests consist of subjecting chilled iron wheels of special quality and mixture to the test required for cast-steel wheels and for steel tires on certain European railroads. The tests were supervised by Mr. Bernard Clark, Mechanical Engineer of the New York, Lake Erie & Western; Mr. Robert Potts, Division Master Car Builder of the Michigan Central, and Mr. N. B. Trist, Wheel Inspector of the Pennsylvania Railroad, who made all the records and certified to their correctness. The President of the company says: "Their tests demonstrated the results we have been able to attain from special practice and from the work we have been carrying on in the past 10 years, in the manufacture of special metals and materials. There is a large amount of additional detail in connection with the subject which we would be very pleased to give to those who are particularly interested."

Austro-Hungarian State Railroad Test.—Wheel placed upright on heavy iron and stone foundation. Weight of 475 lbs. dropped from varying heights commencing at one meter, and increasing by half-meters to six meters (about 20 feet). Wheel required to stand eight blows in all.

##### Test No. 1.

Applied to standard wheel Hungarian State Railroad Specifications, 905 millimeters in diameter (35 inches) weighing 840 lbs.

To	Blow	Meters	No effect.
7th	4	4 1/2	Check 6 in. long on tread into flange.
8th	5	5	Broke through flange and part of tread.
10th	5 1/2	5 1/2	No change.
11th	6	6	Showed several transverse cracks on tread, starting from original fracture at 9th blow.
12th	6	6	Cracked partly through tread and flange into plate.
13th	6	6	Checked across chill.
14th	6	6	No change.
15th	6	6	Checked into plate about 4 in.
16th	6	6	Cracked to hub extending through both plates.
17th	6	6	Broke in two pieces.

##### Test No. 2.

Applied to standard wheel Austrian State Railroad Specifications, 950 millimeters in diameter (37 1/2 inches) weighing 800 lbs.

To	Blow	Meters	No effect.
7th	4	4	Check through flange and part of tread into bracket.
8th	4 1/2	4 1/2	4 fine checks on side away from flange.
9th	5	5	Old check opened wider across tread.
10th	5 1/2	5 1/2	No change.
11th	6	6	Check about 6 inch into plate from tread.
12th	6	6	Check in bracket opened up.
13th	6	6	No change.
14th	6	6	No change.
15th	6	6	Check on bottom of wheel.
16th	6	6	Crack extending into hub.
17th	6	6	Crack through hub; 1 bracket cracked.
18th	6	6	Crack through entire wheel.
19th	6	6	Broke in two pieces.

##### Test No. 3.

It will be noted that the above test requirement is for wheels weighing 800 lbs. and over. This test made on wheels weighing 590 lbs.

Applied to 30-in. Engine Truck Spoke Wheel, L. S. & M. S. Railway Standard, weighing 590 lbs.

To	Blow	Meters	No effect.
6th	3 1/2	3 1/2	Check in throat on top.
7th	4	4	Crack on tread (semi-circle).
8th	4 1/2	4 1/2	Second crack on tread (concentric to first).
9th	5	5	Crack from tread through rim half way round rim.
10th	5 1/2	5 1/2	Crack through entire tread, and one spoke on side cracked through.
11th	6	6	Four spokes and rim top and bottom cracked through.
12th	6	6	Broke in three pieces.

##### Test No. 4.

German State Railroad Test.—For cast-steel wheels and cast-steel centers for steel-tired wheels. Wheel placed horizontally supported on wooden blocks—tapering steel wedge being placed in bore of wheel. Weight of 410 lbs. dropped from varying heights on this wedge, commencing at 1 1/2 meters, and increasing by half meters to four meters. Wheel must stand six blows in succession.

Applied to wheel 990 millimeters in diameter (39 in.), weight 840 lbs. German State Railroad Specifications.

To	Blow	Meters	No effect.
12th	4	4	Fracture extending 5 in. from center.
13th	4	4	No change.
14th	4	4	Cracked both sides through hub into bracket, 3d crack through core hole.
15th	4	4	No change.
16th	4	4	First crack opened up through rim.
17th	4	4	Broke in two pieces.

NOTE.—Weight of 475 lbs. actually used.

##### Test No. 5.

French State Railroad Test.—For Steel Tires. Tire placed upright on heavy iron and stone foundation. Weight of 2,200 lbs. dropped from a height of 4 1/2 meters (about 14 ft. 8 in.). Tire must stand three blows without breaking.

Applied to New York Car Wheel Works special chilled wheel. Diameter 1,050 millimeters (42 in.). Weight 1,075 lbs.

1st Blow	4 1/2 Meters	Cracked on tread (semi-circle).
2d	4 1/2	Was not struck in same place as first blow, but 18 in. one side. No effect.
3th	4 1/2	Struck between first and second blow. No effect.
4th	4 1/2	Broke 14 in. out of flange, and checked in two places across tread, 6 in. apart. One check was the center of blow. Check on opposite side of center check. Center check opened up.
5th	4 1/2	Center check extended through flange to plate. Check in plate on opposite side; longitudinal zigzag check on tread.
6th	4 1/2	Center check extended through flange to plate. Check in plate on opposite side; longitudinal zigzag check on tread.

NOTE.—Wheel stood six blows without breaking—twice the test requirement. After sixth blow, test was discontinued.

##### Test No. 6.—See note.

Master Car Builders' Standard Test.—Wheel placed horizontally on heavy iron and stone foundation. Weight of 140 lbs. dropped from height of 12 ft. on hub. Wheel required to stand five blows without breaking.

Applied to a 36-in. wheel, Master Car Builders' Specifications for Passenger service, weighing 750 lbs.

Blow	1 to 37	No effect.
38	38	Plate cracked.
39 to 47	47	No change.
48	48	Small piece out of tread, and cracked through tread.
49 to 55	55	Cracks gradually widen.
56	56	Broke in two pieces.

##### Test No. 7.

The same applied to a 42 in. wheel, Master Car Builders' Specifications for Passenger service, weighing 1,075 lbs.

Blow	1 to 43	No effect.
44	44	Crack in plate.
45 to 189	189	No change.
190	190	Cracked through tread.
191 to 262	262	Cracks gradually widen.
263	263	Broke in three pieces.

##### Test No. 8.—See note.

The same applied to a 33-in. wheel, Master Car Builders' Specifications, weighing 600 lbs.

Blow	1 to 22	No effect.
23	23	Plate cracked.
24 to 44	44	No change.
45	45	Cracked through tread.
46 to 62	62	Cracks gradually widening.
63	63	Broke in three pieces.

NOTE.—The difference in comparative result of tests No. 6 and 8 as against test No. 7, is due to the fact that the 42-in. wheel was made of same weight as 42-in. steel-tired wheels, and correspondingly heavier in section than the 33 and 36-in. wheels, and in consequence proportionately stronger. For special passenger service it is recommended that the 33 and 36-in. wheels be made of the same weight as steel-tired wheels of like diameter, as follows: 33 in., 150 lbs.; 36 in., 900 lbs.

#### Electric Railroads and Private Right of Way.

BY JULIUS MEYER, C. E.

Street railroad men have got accustomed to looking upon the public highway as the natural free right-of-way for their tracks. Following out this idea when electric inter-urban connections came to the front, they selected the well-traveled chartered turnpikes and plank roads for the same purpose. Choice properties were quickly acquired and in some instances the electric railroads on them actually built. Recent decisions of the courts, however, have put a different aspect on the eligibility and desirability of turnpikes for the right of way of electric railroads, and it is doubtful if they will be coveted in the future as they have been in the past.

A case in point is that of the Atlantic Highlands, Red Bank & Long Branch Electric Railway, 18 miles. The company was organized in the State of New Jersey under the Traction Law of 1893, which gives traction companies the right of acquisition of, and consolidation with turnpike companies. It filed eventually on the property of the Red Bank & Eatontown Turnpike Co. and on that of the Eatontown & Long Branch Turnpike Co. The former corporation had gone through a receivership and was sold to the latter, which kept up its organization under the name of the Eatontown & Seashore Turnpike Company. This latter corporation abolished the toll on both turnpikes for the consideration of the maintenance of the body of the turnpike by the respective communities, but reserved its right under the Turnpike Law of 1890, viz., to construct and operate an electric railroad on the turnpike, which right was more over fortified by a special law covering this particular case.

Under the law of 1890 the Township Committee "shall" locate the tracks on the turnpike. When, however, the committee in question was applied to for such location, it was advised by counsel of its inability to comply. The matter was taken into court, which found the special law unconstitutional, and decided that a turnpike company was unable to sell to or acquire from another turnpike company the right to construct and operate an electric railroad, no provision of trading having been made in its charter. Furthermore, the court holds that the construction of an electric railroad on a turnpike imposes an additional burden on the adjacent property owner. His consent is, therefore, necessary in addition to that of the turnpike company.

Another obstacle was erected through a Pennsylvania decision.\* The Montgomery County Traction Company, whose line is located in several townships, was permanently enjoined from constructing parts of its railroad on acquired turnpikes before having a continuous right of way from end to end.

In the face of such difficulties and with the necessity of obtaining the consent of the abutting property anyhow, some electric railroad organizers have come to doubt the advisability of further considering turnpikes and plank roads as right of way for interurban railroads, and the pros and cons of private right of way undergo careful scrutiny.

Among its favorable features are the absence of restrictions of accident insurance companies, limiting the speed to 10 miles an hour on highways and 6 miles an

\* See the current volume of the *Railroad Gazette*, pp. 198, 220 and 658 for a fuller statement of this and another Pennsylvania case.—EDITOR.

hour within city, town or village limits, and the absence of restrictions regarding making up time when a car is behind time. The public having no right to drive or walk on a private right of way, a speed of 30 miles an hour should be attainable. Again, the jurisdiction of the township committees is confined to the road crossings; specifications of roadbed and track construction can therefore be no longer subject to their approval and consequent injudicious meddling with matters foreign to their knowledge. The paving and maintenance of the public highway can no longer be imposed on the railroad company.

But the disadvantages are also numerous. Fencing of the right of way and car approach signals on highway crossings would very likely become unavoidable, and materially increase the first cost. The naturally low upper limit for right of way expenditures will permit only in exceptional cases of its location through a populous neighborhood, where it should be located for patronage. If it skirts the population, or runs through it in spots only, the street railroad will approach the depot feature of the steam railroad, its convenient accessibility becoming limited to certain stretches. Such an electric railroad would be more like a steam railroad, with frequent, say single dummy cars for passenger service, avoiding the heavy train tonnage, which it takes considerable distance to brake, and intrusting its conductors altogether with the collection of fares, which they must do to a limited extent anyway.

A new type of railroad may thus be evolved, which sheds some of the rigidity of the steam railroad and takes on some of the elasticity of the electric railroad—a type to which the latter will rise and the former come down. Organizers and negotiators, however, will not overlook the fact that the steam railroads themselves may advantageously take this step in many cases, where their competition would effectually kill paralleling electric lines.

#### Further Records of the Richmond Compound No. 2427.

Supplementing the article published last week in the *Railroad Gazette* giving the service record of the Richmond compound No. 140 on the Chesapeake & Ohio, we

Island to Bear Island, 165 miles, was made in 5 hours and 25 minutes. The attached reports show the saving by the compound in each case:

#### Webb Compound Locomotives for Freight.

*Engineering* of Nov. 8 publishes a large engraving of a compound locomotive designed and built by Mr. Webb for mineral traffic on the lines of the London & North Western in the South Wales district. The first engine of this class was built at Crewe in 1893, and the results of its working have been so good that nine of the same class have been built.

The engine is a three-cylinder compound on the Webb system; two high pressure cylinders and one low pressure. It has eight drivers all coupled and the entire weight of the engine, 49 tons and 5 cwt., is carried on these drivers. The drivers are 4 ft. 5½ in. in diameter, 5 ft. 9 in. between centers and the total wheel base is 17 ft. 3 in. The drivers all have flanges, but the leading and trailing axles have ½ in. side play. The driving axle is the second one from the front. To this low-pressure outside cylinders are connected by outside crank pins set 90 degrees apart. The inside low-pressure cylinder is connected to a crank in the axle set at an angle of 135 degrees with the high-pressure cranks.

The high-pressure cylinders are 15 in. diameter by 24 in. stroke and the low pressure is 30 in. × 24 in. The cylinders are all bolted together in line, the low-pressure cylinder being immediately under the smoke-box with its steam chest on top.

The high-pressure cylinders are outside, but their steam chests are inside the frame. The valves of these latter are worked by the Stephenson link motion. The low-pressure valve is worked by Mr. Webb's single eccentric motion.

The first three axles are equalized. The trailing axle has the ordinary English cross spring. This axle carries three tons less weight than the first and third axles and nearly five tons less than the driving axle.

The mean diameter of boiler outside is 4 ft. 3 in., and its length 15 ft. 6 in., and it contains 210 tubes each 1½ in. diameter outside and 13 ft. 4 in. long. The heating surface is: Firebox, 144.7 sq. ft.; tubes, 1,374.3 sq. ft.;

what resembles a piston valve cut in half longitudinally and seated on the flat surface instead of the rounded portion. *B* is the solid end of the valve stem and *D* the loose end which is held by a pin so as to form the yoke. The bottom faces are held together by ribs ½ in. thick. These are best shown in Fig. 3. *H*, the valve cover, is a half-cylinder, and might be termed a movable bushing, as it is not fastened tightly in the steam chest, but is given a slight longitudinal motion and held in position by the lugs *C* on the steam chest cover. Along the top of this cover are two small ribs *E*, Fig. 2, which serve to guide the oil to the ends of the cover. Around the valve are packing rings held against the cover by small springs

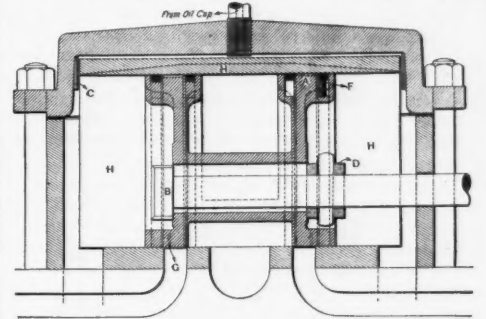


Fig. 1

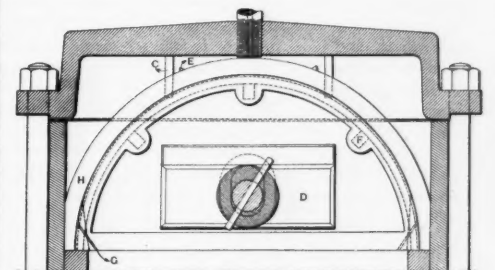


Fig. 2

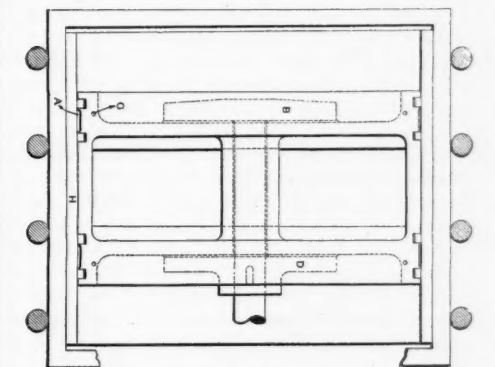


Fig. 3.

A New Slide Valve.

seated in the pockets *F*. Between these rings are small passages *A* which have communication with the steam ports through the openings *G*. This allows steam from the ports to balance the pressure of the steam against the face of the valve.

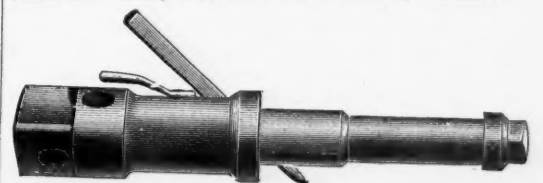
This balance feature is said to operate very satisfactorily and with less trouble than the ordinary methods.

In the construction of the valve, its two halves are cast separately and the faces planed up. The two halves are then placed face to face and the outside turned off. The same process is followed in making the cast-iron cover, though it can also be made by bending ½-in. plate to a suitable radius. When it is necessary to face off the valve, the same amount of metal is planed off of both valve and cover.

In its effect on the steam distribution the valve is the same as the ordinary "D" valve. The double port is not employed.

#### The Vance Lightning Flue Cutter.

This tool is made by the Haines Gage Co., of 906 Filbert street, Philadelphia, and is used for cutting out tubes or flues. Its design is shown in the accompanying engraving. A feature of the tool is the fact that one revolution of it cuts out one end of the flue, leaving it scarfed ready for welding. This should save time, since it becomes unnecessary to recut flues in a machine, and there



are no flue holes to refile, the flue ends not being hammered out of shape or lattered up. The cut bevels and slightly contracts the ends of the tubes, so that they may be removed through the flue holes. It is claimed that the knife is as easily sharpened as a common cold chisel. The tool is made for sizes of flues from 1½ in. up to 4 in.; It is said that one man can cut from 400 to 500 tubes (one end) in 10 hours.

TABLE 1.—SIMPLE AND COMPOUND 10-WHEEL ENGINES—CHICAGO, ROCK ISLAND & PACIFIC.

Richmond compound, No. 2427.						Rock Island simple, No. 808.					
Cylinders 19 in. and 30 in. × 24 in.—Drivers 62 in.—Condition—Out of shops nine months.						Cylinders 19 in. × 24 in.—Drivers 62 in.—Condition—Just out of shops.					
Date.	No. of 100 ton miles.	Pounds of coal used.	Lbs. coal per 100 ton mile.	Ounces coal per ton mile.	Actual running time.	Date.	No. of 100 ton miles.	Pounds of coal used.	Lbs. coal per 100 ton mile.	Ounces coal per ton mile.	Actual running time.
June 17.....	2,152.50	16,770	7.70	1.232	8:20	June 18 ..	2,104.78	25,800	12.25	1.960	8:36
" 20.....	1,834.74	15,400	8.39	1.342	6:30	" 19 .....	1,695.08	20,000	11.80	1.880	8:10
" 23.....	1,884.51	15,900	8.43	1.349	7:25	" 22 .....	1,606.89	15,950	9.92	1.587	7:20
" 25.....	1,788.62	16,880	9.43	1.509	6:30	" 23 .....	1,775.64	17,600	9.90	1.584	6:55
" 26 .....	2,193.25	18,030	8.22	1.315	7:45	" 24 .....	1,932.67	21,400	11.07	1.771	8:31
" 28.....	2,068.33	16,000	7.73	1.237	7:20	" 26 .....	1,365.45	15,850	11.60	1.856	5:45
" 30.....	2,065.80	16,350	7.91	1.263	7:20						
Averages.....			8.27	1.323					11.09	1.774	

Saving in favor of compound 25.4 per cent.

TABLE 2.—SIMPLE AND COMPOUND 10-WHEEL ENGINES—CHICAGO, ROCK ISLAND & PACIFIC.

(Same Engines and Conditions as in Table 1.)

Engine No. 2427.							Engine No. 808.						
Date 1895.	Number of 100 ton-miles.	Pounds of coal used.	Pounds of coal per 100 ton-mile.	Ounces coal used per ton-mile.	Actual running time.	Distance.	Date 1895.	Number of 100 ton-miles.	Pounds of coal used.	Pounds of coal per 100 ton-mile.	Ounces coal used per ton-mile.	Actual running time.	Distance.
6-17	2,152.5	16,770	7.79	1.2464	8:20	140	6-18	2,104.78	25,800	12.25	1.9600	8:36	155
19	1,353.0	15,400	11.23	1.7968	6:05	165	19	1,695.08	20,000	11.80	1.8880	8:10	165
20	1,834.74	15,400	8.39	1.3424	6:50	165	22	1,606.89	15,950	9.92	1.5872	7:20	145
22	1,359.6	16,000	11.76	1.8816	5:25	165	23	1,776.64	17,600	9.90	1.5840	6:55	165
23	1,884.51	15,900	8.43	1.3488	7:25	165	24	1,932.67	21,400	11.07	1.7712	8:31	165
25	1,788.62	16,880	9.43	1.5088	6:30	165	26	1,365.45	15,850	11.60	1.8560	5:45	165
26	2,193.25	18,030	8.22	1.3152	7:45	165	27	1,763.15	14,600	8.25	1.3200	8:10	165
28	1,658.36	15,800	9.50	1.5200	6:25	165	30	1,433.14	15,800	11.00	1.7600	7:45	165
29	2,068.33	16,000	7.73	1.2368	7:20	165	7-1	1,432.25	19,000	13.26	2.1216	6:55	165
30	2,065.8	16,350	7.91	1.2656	7:20	165	3	1,609.31	19,250	11.96	1.9136	8:25	165
7-3	1,917.38	17,000	8.73	1.3968	6:45	165	5	1,700.58	17,600	10.34	1.6544	6:50	165
5	2,199.36	19,500	8.87	1.4192	8:55	165	6	2,026.22	18,800	9.27	1.4832	9:45	165
.....	22,505.48	198,830	.....	.....	85:05	1,955	.....	20,452.16	221,650	.....	.....	93:27	1,980
Aver...	1,875.45	16,570	8.999	1.4398	7:05	163	Aver...	1,704.35	18,471	10.885	1.7416	7:47	165

Saving for compound, 17.33 per cent.

GEO. F. WILSON, Supt. M. P. and E.

now give a further record of the "tramp" compound No. 2427 on the Chicago, Rock Island & Pacific. The performances of this locomotive have been frequently mentioned in the preceding issues of the *Railroad Gazette*, and have been uniformly good.

In the following reports care was taken to insure accuracy. The coal was weighed on and off the tender every trip and the actual scale weight of each car was taken. The first report was made covering similar classes of trains under the conditions which are obtained in regular service. The second report includes several fast runs with stock trains, which were made to determine the time that could be made in this class of freight in emergencies, the coal economy being a secondary consideration. One of the runs, on June 22 last, was made with a 40-car stock train, when the time from Rock

total, 1,489 sq. ft. The grate area is 20.5 sq. ft. The ratio of grate area to heating surface is 1 to 72.6. The boiler pressure is 175 lbs. per sq. in.

#### A New Design of Slide Valve.

A new design of balanced, locomotive slide valve, invented by Mr. W. F. Gould, is being tried on engine No. 11 of the Des Moines Northern & Western Railroad, and thus far it has given good results. The engine is a Rogers, 8-wheeler, 17 in. × 24 in., with 60-in. drivers. During the month of September it made a mileage of 4,142, and used 15 pints of valve oil, or 276 miles per pint of oil.

Fig. 1 is the sectional view, Fig. 2 the front elevation, and Fig. 3 the plan. It can be seen that this valve some-



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#### EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The value of air-brakes on freight trains was the subject of articles in the *Railroad Gazette* of Nov. 8 and 15. In those articles emphasis was placed on the saving to be effected in the every-day use of a power-brake, rather than upon the emergency feature, or the advantage to be gained from a humanitarian standpoint. The efficiency of this device as a means of saving life or preventing disastrous collisions, is, however, an element in its value that may become prominent at any time on any road; so prominent, we mean, that the benefit derived from it may be counted in definite terms of money. It is true that the air-brake is constantly acting as a preventive of collisions, but in the nature of things the results cannot be formulated in figures. The occasional benefit that we refer to is illustrated in the following account of a collision that recently occurred on a steep grade. This account, confirmed by an officer of the road, is taken from a local paper:

A very costly wreck occurred near here last night which had some exciting features. The grade is so heavy that three engines are required to a train. A coal train, when about half way up the mountain, broke in two. The rear engine was unable to hold the loose section, and down the mountain the engine and cars ran, gaining speed every minute. The brakemen abandoned the runaway train as soon as possible, as also did the fireman, but the engineer stuck to his post like a hero. He remembered that another train was following his up the mountain and that sure death was in store for the men on the first engine of the train unless they could be apprised of their danger. He sounded danger signals, and also set some brakes on the cars; and finally, when he saw the headlight of the oncoming engine, he saved his life by jumping. He was also successful in saving the lives of the men on the engine at the head of the second train. They had heard the danger signals and, knowing by experience on the road what they meant, abandoned their engine just before the collision. The crash was terrific. The two iron monsters were broken like so many toys, and both were totally ruined, together with 26 coal cars.

When a yardmaster puts an engine at the rear of a train expecting to depend upon that engine's holding power to keep the train from running back down hill, it is important to remember that this engine may suddenly find itself with, not merely a half, but with nearly the whole of the train to look out for. Couplings are more likely to part in the front than in the rear portion of a train. A continuous automatic brake is a preventive of such accidents as that described; though it is well to bear in mind that even a power brake is not designed to hold a train after it is stopped. We do not know how steep a grade the engineer and brakemen had to contend with in this case, but ordinarily a runaway backwards, which cannot happen until the train has first come to a dead stop, is attributable to a failure of the men to apply a very little brake power at the right moment; so much so that in making up the monthly record of accidents, we class this kind as due to "negligence in operating."

#### The Nicaragua Canal.

In the New York *Herald* of Monday there appeared what purported to be a synopsis of the report of the Nicaragua Canal Commission to the President. We have not yet been able to get any evidence of the au-

thenticity of this synopsis other than what it carries in itself, nor has the report been given to the public when we go to press. There is, however, such circumstantiality in the synopsis, such probability in the facts and conclusions, and such free use of quotation marks that we feel justified in accepting the *Herald's* publication as correct, within its limits. Apparently it has been made public by a gross breach of faith and manners; and unhappily there are a great many of the *Herald's* readers who will look upon the publication as "smart journalism." Now, of course, every one is at liberty to use the information.

Of course it is dangerous to draw any conclusions from the telegraphed summary without seeing the context of the full report. Perhaps the most important point brought out is the estimated cost. The Board puts this provisionally at about 133½ million dollars. The estimate of the company was a little less than 70 millions. But the Commission gives ample warning that its estimate is only provisional and approximate. The existing data are not sufficient to permit a thoroughly reliable estimate, and the Commission recommends a further study with much more money at command and much more time than the Commission had last summer. The *Herald* says that the recommendation is for an appropriation of \$350,000 and for a term of at least 18 months in which to make the studies. Elsewhere in the *Herald's* report the estimated cost of the further examination is put at \$250,000. The appropriation for the work of the present Commission was but \$20,000 and the Commission was appointed in April to report to the President this Fall. Obviously their study was of necessity strictly limited.

One of the details of the company's plan that is apparently most seriously questioned is the great Ochoa dam. It will be remembered that the proposition is to build a dam 70 ft. high and 1,900 ft. long across a great river. This dam is to be of loose rock and to stand on the sand. It is proposed to bring down the material from above and continue to dump it in until it settles to such slopes as will stand. The Commissioners say that "a search should be made for better location for this structure, and that the full nature of the foundations and of the shore line connections should be exhaustively ascertained. A dam such as is proposed has no precedent, and its erection in conflict with the unknown volume of the floods presents grave difficulties." Its dimensions and cost cannot be reliably estimated.

The San Juan River, from Ochoa to the lake, should be thoroughly surveyed and observations made for at least a year to determine its slope, volume and surface elevation. Full exploration should be made of the river bed to determine the materials to be excavated. The channel in the stream should have a bottom width of not less than 250 ft. enlarged to 300 and 400 ft., in the bends, instead of the width of 125 ft. proposed by the company. The depth should be carried to 30 ft. instead of the proposed 28. The excavated channel in the lake should be 300 ft. wide instead of 150 ft. as proposed. Other changes proposed are the introduction of passing sidings and the establishment of a greater depth; the reduction of the lift of the first flight of locks and dams. Additional borings should be made on the axis of the great cut and parallel thereto to get information as to the materials and their distribution, as the slopes proposed by the company may have to be increased, enlarging the contents of the cut.

These are the chief facts telegraphed to the *Herald*. We shall defer any discussion of them until we get more information, or at least some confirmation of the accuracy of this synopsis.

#### Air-Brakes on Freight Trains.

The paper by Mr. Waitt, which appears on another page, is not only interesting but important, and we only regret that we cannot give the space to reprint it in full. Every word of it should be read (and doubtless will be when it is available in the publications of the Western Railway Club) by a great number of railroad men in various departments, as well as by the makers of air-brakes and of hose connections, and especially by the latter.

The paper is indeed a severe criticism on brake practice in freight service as it stands to-day, and perhaps it is too severe. We judge, at least, that it will give a wrong impression; Mr. Waitt's sense of proportion is a little defective. We should suppose that he is talking more of exceptions than of the rule in his charges of bad design, bad construction, bad inspection and bad maintenance. For example, he says that castings with sand holes are "frequently" found, showing carelessness of inspection by the makers and the users. He probably should have said, and would have said, if he had written with more deliberation, "sometimes found." Probably 99 out of every 100 such defective triple cases are returned to the Westinghouse people

and they have informed us that probably not one triple case in 5,000 has this defect. This is what we mean when we say that Mr. Waitt has not carefully preserved the proportions in his valuable paper. Note further what he says of the number of freight wrecks caused by hose and hose coupling failures. We suspect that it will be hard for him to convince the eleven obstinate jurymen that he is precisely right in this.

About one-third of the cars now running in freight service are equipped with the Westinghouse brake. The first cost of this equipment has not been less than \$20,000,000, and it has probably been nearer \$23,000,000. It is hard to imagine that this great investment should be left in the useless and even dangerous condition that a hasty reader of Mr. Waitt's paper might suppose it actually is left in. Indeed, it is probably not in this condition. A fairly efficient service is got even now on a great many railroads, and in most cases the railroad companies that have bought air-brakes are probably getting a reasonable interest on their investment; not all that they should get, but still a sufficient interest to warrant the investment. A glimpse of the experience of the New York Central was given in an article published by us Nov. 8, page 741, and we are credibly informed that many other roads are getting results as good or nearly as good. Possibly some of them are getting even better results.

But Mr. Waitt's statements are specific: they cannot be ignored or lightly set aside. They are drawn largely from the scrap heap, that precious and too much neglected teacher, of which Mr. Don J. Whittemore once said: "The scrap heap, that inarticulate witness of our blunders and the sepulchre of our blasted hopes, the best but most humiliating legacy we are forced to leave to our successors, has always to me been brimful of instruction."

One of the most instructive studies of the scrap heap made by Mr. Waitt was that bearing on air-brake hose. He says that the Lake Shore has hose failures by the fifties in a month. This is an example of a failing case in modern brake practice to which the attention of our readers has often been called. Unfortunately, statistics of burst air-brake hose are not available in this country, at least outside the archives of the individual railroad offices; and everybody knows how unlikely it is that we should be allowed to publish such records even were we allowed to see them. Mr. Waitt's candor is unusual. But very full and accurate records bearing on this point are available from England. In times past we have taken the trouble to gather from the blue books compiled by the Railway Department of the British Board of Trade the number of cases of burst hose in passenger service in that country. We have made no recent examination of the blue books with reference to this particular point, and it is not necessary to do so for present purposes. In the half year ending June 30, 1889, there were in the United Kingdom 150 cases of delays to trains due to burst hose; there were 71 delays due to other faults of brake apparatus or material. In the half year ending June 30, 1890, the figures were 158 delays due to burst hose and 110 from other defects. These figures give a notion of the proportions in English passenger service. How far they apply to American freight service we cannot even guess; but it is entirely safe to say that if accidents to air braked freight trains arising from the bursting of hose connections could be eliminated, that one step would make an immense difference in the account. We do not venture an estimate of the percentage of troubles that would disappear, but it would be a very great one. Mr. Waitt has done a public service in calling attention to this point, and we have not the least doubt that his paper will have a great effect on the makers as well as the users of air-brake hose.

Mr. Waitt's presentation of other defects in present practice is vivid, and calculated to impress his readers with the importance of doing something, but we shall defer further discussion of his paper to a later issue.

#### Some Results of an Engineering Education.

We have long been of the opinion that the engineer is the flower of the human race; that he is the most interesting man to meet, and the safest man to trust in any matter of morals or business. At least, we have been of the opinion that if this is not absolutely true of the present generation it is sure to be true of the next. A proposition so sweeping is always hard to maintain, and indeed there are many painful examples which cast doubt upon the truth of this one in general, yet we still believe that it is true. Theoretically, it ought to be so.

The effect of the engineer's education and of his practice is straight thinking. Almost any other man can fool himself into thinking that he can dodge the inexorable working of the laws of the universe. The engineer cannot fool himself or anybody else very

long. He must constantly test his work by the eternal facts. The capacity to think straight and the habit of thinking straight are the surest foundation of honesty, and the most certain elements of success in any walk of life. They give the most abiding charm to character and to conversation. Even in our most trifling moments we soon get tired of the in-cere mind however glittering. And so we reason ourselves around to the proposition with which we started. If it is not true it ought to be. If it ought to be true it probably is.

All of this is suggested by some figures recently compiled under the direction of Professor Fuertes, of Cornell. He has undertaken to show what has become of 386 graduates of the College of Civil Engineering of Cornell University. He finds among these 8 presidents of railroads, 8 presidents of industrial corporations, 17 city engineers, 35 engineers in practice, 5 consulting engineers, 9 contractors and 37 chief engineers, managers or superintendents of municipal or corporate works or manufacturing establishments. He finds 22 professors in colleges and 15 associate professors and instructors. Of certain groups containing 111 of these alumni nearly all are assistant chief engineers or assistant engineers for manufacturing, municipal works and corporations. There is another group of 52, one half of whom are mining, mechanical or electrical engineers, and the others architects, ship builders and patent lawyers. Finally there is a group of 22 of these alumni containing clergymen, merchants, bankers, farmers, and, we grieve to say, two politicians. It is true that the list compiled by Professor Fuertes accounts for only 341 out of 386. Of the others 28 have died and 17 had not been heard from when the list was made up. Possibly there may have been among these 17 still other politicians who have chosen thus to conceal their deterioration.

The New York Sun says, "Is there any other institution in the United States for the training of young men that can present such a record? If there is we should like to hear from it." Doubtless there are several such institutions in the United States. In fact, we should suppose that quite as honorable a record could be drawn from the annals of any of the important engineering schools.

Not long ago a pamphlet was published giving partial records of the graduates of the Rensselaer Polytechnic Institute, bringing the story down to the end of 1892. The first graduating class was in 1826, when 10 men were graduated. The total down to the end of 1892 was about 1,000; we have not the exact figures. Of these gentlemen 69 had held the position of chief engineer; 34 were known to have been presidents of corporations; 121 had been vice-presidents, general managers or superintendents of railroads, bridge companies, steel and iron works, mining companies, coal companies, water works, canals, etc.; 56 had been professors and assistant professors in the higher institutions of learning in this and other countries, besides whom many others had served in colleges and technical schools as teachers in various capacities. It was ascertained that graduates of this institution had held positions as presidents, vice-presidents and engineers, managers or superintendents of railroads, aggregating over 109,000 miles in North America, while many miles of railroad had been built by them in South America, Europe and Japan.

Before December, 1892, 190 graduates of the R. P. I. had become members of the American Society of Civil Engineers, 146 of them in the highest grade of membership. That is, 11 per cent. of the membership of the Society was made up of the alumni of the R. P. I. While membership in the American Society of Civil Engineers is not an absolute test of character or attainments, it is presumptive evidence that the man holding it stands considerably above the mean plane of human success.

Since the above words were written the Sun has printed a second article on the subject, giving the following information, furnished by President Morton for the Stevens Institute: Since 1875, 551 men have graduated there with this record: Superintendents and managers of the entire business of important departments of machine shops and like engineering works, 148; consulting engineers, carrying on professional work on their own account, 54; professors in technical or engineering colleges or schools, 30; assistant engineers or superintendents in workshops and like mechanical establishments, 55; presidents, vice-presidents, secretaries and treasurers of manufacturing companies, 16; employed in designing, drawing and superintending construction of machinery, 103; patent lawyers and solicitors, agents, and inspectors for manufacturing companies, 36; superintendents of motive power on important railroads, 8; in employ of foreign corporations, 13; editors of engineering journals, 6; architects, 3; chemists, 4; unknown or not classified, 50; deceased, 25.

Of course the engineer has had a hard time in the last two or three years. Great crises like that through

which we have been passing affect him especially, and the civil engineer, like the members of any other profession with which we have come in contact, likes to grumble about his own hard lines in the world. The chances are that the next doctor or lawyer or architect whom you meet on the street will tell you that his profession is overcrowded, and advise you strongly to put your boy into some other calling, and statistics show that about 90 per cent. of those who go into business fail. Therefore, the engineer has no monopoly of hard times and precarious livelihood, and we still insist that there is no other training that is so sure to make a successful and useful and happy man.

#### The October Discussion of Block-Signal Rules.

The proceedings of last month's meeting of the American Railway Association have been issued by the Secretary. The train-despatching rules of the Standard Code, 500-527, which have been revised by the Committee on Train Rules, were reported with very few alterations,\* and were adopted practically as reported, except that in rule 523, where the committee said, "may be superseded or annulled," the Convention expunged the last two words.

The only other business of importance, not covered by the report given out by the Secretary in October, was the discussion of the rules reported by the Joint Committee for the "Telegraph Block Signal System," which occupied the greater part of the time of the meeting both days.

This discussion made but little progress, and the result seems disappointing. It is a good thing that the discussion took place. Every railroad officer responsible for making or enforcing train rules realizes that the subject is grave, intricate and difficult to deal with, and he is pretty sure to find profit in a discussion of this kind among superintendents, even if half the talk is by men who know less about the subject than himself. Therefore he deems it a benefit to have been present to hear it. At this particular meeting many good things were said. But, premising the remark with this qualification, we are bound to say that the Joint Committee is leading the Association a dreary tramp through a muddy path, to get through a very small piece of woods. The attendance during the latter part of this discussion was not very large and a good deal of energy seems to have been wasted, because there were not enough interested men present to ask pertinent questions. The chairman of the committee repeatedly asked for (intelligent) criticisms and he got some; but he got more from men who were not well prepared to discuss the points at issue. Under the circumstances this is no disparagement of the men who asked such questions, but the result is abortive, nevertheless; and people who do not attend the conventions will mentally associate the dignity of the Association with a discussion which was really but little more than a committee conference. There was much force in the demand of Mr. Metcalfe that when a committee is radically divided the minority should present a report to the Association. This would greatly clarify the atmosphere.

The most protracted discussion was on Rule 210, proposed by the committee. This rule (for signalmen) reads:

210. When notice is received that a train on double track is to cross over to the opposite track, the signalman must notify the signalman at the next block station in the direction in which the train is moving and receive his acknowledgment.

Permission may then be given the train to cross over, and no following train shall be admitted to the block under "clear" signal until notice is received that the block is clear.

Signalman receiving notice of train to cross over to opposite track will not give the acknowledgment until he has ascertained that the block on the opposite track is clear. After the acknowledgment has been given he will not admit a train to the block under clear signals until notified that the block is clear.

The vagueness which was spoken of in the discussion as a characteristic of this rule appears in the very first line. Notice from whom? This query at once arises in the mind of the signalman and befogs him all through. Does this rule apply to crossovers close to the signalman, or only to those half way to the next block? By study, the application of the rule may be made out, but a rule requiring such study is undesirable. Here, as in many of the rules that

\* In rule 50 the recommendation that an order should include but one movement is cut out. Rule 59 is altered in the last line so as to require the engine-man to read the order to somebody. In 10 and 512 the full faced type is abandoned. Rules 515 and 516 are omitted. Rule 521 has this paragraph added: "An operator must not acknowledge the receipt of an order for a train that is at his station, the engine of which has passed his train order signal, until he has personally notified the conductor and engine-man that he has orders for them." Rule 53 is amended so that part of an order may be superseded. The last paragraph of this rule reads: "Orders held by or issued for a regular train are annulled when such train has lost its rights, as provided by rules 20 and 107." [This language is not so good as that of the Pennsylvania Railroad code, which says "are to be considered as annulled."] The note under form L, prohibiting the superseding of an order containing two movements, is omitted. The note under form H is amended, so that a train receiving an order concerning a work train "must run expecting to find the work train protecting itself," etc.

have been up before the American Railway Association, more words would be an advantage. Brevity is not the sum of all excellence. The attempt to be brief and comprehensive at the same time is the cause of the vagueness. Why not have a rule for crossovers at the signal station and another for those out on the road? For the former, the English standard rule (No. 5) may give us some points. That rule reads, in part:

5. (This signal must only be used where it is specially authorized by a note at the foot of these regulations.) When the line is clear to the home signal, and it is necessary for a train to be allowed to approach cautiously in consequence of an obstruction existing ahead of the home signal, or from any other cause, the "be ready" (or "is line clear?") signal must not be acknowledged, in accordance with Rule 3, but the "section clear but station or junction blocked" signal must be given, and when this signal has been acknowledged, the block indicator must be placed to the "line clear" position. The signalman receiving the signal must (if the train has not already passed the home signal toward the starting or advanced starting signal) bring the train to a "dead stand" at the home signal, and verbally instruct the driver that the section is clear, but the station or junction ahead is blocked. A green flag by day and a green light by night must at the same time be exhibited to the driver, and the necessary fixed signals lowered to give permission for the train to proceed. The "train entering section" signal must then be given and acknowledged, and the block indicator placed at the "train on line" or other authorized blocked position.

Where the home signal is at such a distance from the signal-box that it is not possible for the signalman to communicate verbally with the driver when the engine is standing at the home signal, the signalman must, after bringing the train to a dead stand at the home signal, lower it to allow the driver to draw up to his signal-box, and must stop the train at the signal-box by exhibiting a red flag by day and a red light by night. The driver must then be verbally instructed that the section is clear, but the station or junction ahead is blocked; after which a green flag by day and a green light by night must be exhibited to the driver and the necessary fixed signals lowered to give permission for the train to proceed.

If a train is assisted by an engine in the rear, a green flag by day and a green light by night must also be exhibited to the driver of the engine in the rear of the train. . . .

The whole of this English code was printed in the Railroad Gazette of June 14 and 21 last. We do not hold up this rule as a model. Both this and the American rules could be simplified by the use of diagrams. For crossovers too far away to be watched by a signalman the rule of the Pennsylvania Railroad (No. 209 P. R. R. code) seems simpler than that recommended by the Committee. The Pennsylvania gives instructions to both the signalman and the conductor in the same rule. The proposed standard rule (210) is for signalmen only, and another (No. 241) is proposed for the enginemen on the same subject. Rule No. 241 does not make up for all of the alleged defects in No. 210 though it partially explains it. The Pennsylvania rule reads:

When a train is required to cross over to the opposite track between block stations, the conductor, before crossing over, must so notify the operator at the block station to be last passed. This operator must notify the operator at the next block station in the direction in which the train is moving, who must display green for any train approaching on the opposite track, until informed that the train that was to cross over has reached one of the block stations. The train must not enter the block until the conductor is informed that the operator at the next block station has been so notified, and Rules Nos. 100, 101 and 102 must be observed.

This and the similar rules of other roads\* merit consideration in any discussion of the proposed additions to the standard code, for the reason that these rules that have been in actual use for several years are likely to continue in use for some time longer, and it is pertinent, as regards any proposed wording different from the wording of these, to demand the reason for the change. When a discussion of two days leaves us just where we began, it is not to be wondered at that superintendents stick to the rules they have, good or bad.

Every one acquainted with the use of the space-interval system on American roads will appreciate the statement of the committee that they find very difficult conditions to deal with. The theoretical demand is that the committee shall make good rules to go with poor facilities. A Western member cited, as an illustration of the conditions met with, the case of a local

\* The Erie rule reads: 11. When it is necessary for a train to cross over on to the opposite track, the conductor, before crossing, shall notify the signalman at the block station nearest the cross-over to be used. The signalman shall then notify the signalman at the next block station in the direction in which the train is moving, and the train shall not cross over until the conductor is notified that the signalman at the block station in advance has been notified and a flagman sent out in accordance with rule 99. When the signalman in the advance station is notified he shall stop any train approaching on the opposite track and notify the conductor and engine-man in writing that the train has crossed over. He may then allow it to proceed under a green signal. If a train is in the block on the track to which the train is to cross, the signalman shall not permit this train to cross over until the other has arrived at his station.

When a train pulls or backs out of a siding or crosses back to its own track, before doing so the conductor shall notify the signalman at the block nearest the switches to be used. The signalman shall then notify the signalman at the next block station in the rear, and the train shall not pull or back out or cross over until the conductor is notified that the signalman has been advised. When the signalman in the rear block has been so notified, he shall stop any train approaching on the track obstructed, and shall not until the block is clear. If a train is in the block on the track to which the train is to pull or back out or cross back on, the signalman shall not permit the train to pull or back out or cross over until the train has arrived at his station.

freight, starting at 10 a. m., into a block section several miles long, with three hours work to do at intermediate sidings in the section, and to be followed by a passenger train at 11 a. m. The proposition to make rules for running the passenger train through that block at full speed, in time of fog, by the space interval, is absurd. If the road cannot afford to provide communication between the local conductor and the signalmen, it can do better with the time-interval system. There is no actual demand upon the committee to try to make the proposed practice safe, simply by surrounding it with restrictive rules.

But the use of the time-interval on a road where trains stop an hour or two at non-telegraph stations, as in this case, does not afford the slightest ground for mixing up the time-interval and the space-interval, as was suggested in the proposition, at the meeting, to depend upon the use of the flagging rule (99) to make up for any weakness in the cross-over rules (210 and 241). It was even proposed to do without the cross over rules entirely; but Mr. Knibloe and Mr. Fitch pointed out the inconsistency of making imperfect space-interval rules and then depending upon the vigilance of flagmen to prevent disastrous results from them.

The reader will understand, of course, from the previous report of the convention, that the whole of this discussion was informal, the meeting acting in the capacity of a committee of the whole. The Joint Committee reported the proposed rules for discussion only, and the whole report was recommended. The Association, in approving the rules, expressed some sort of approval of the action of the majority of the committee thus far, and virtually recommended that the same rules be reported in more formal fashion at the next meeting; but numerous opinions expressed in the discussion may very likely lead to modifications between now and next April.

At the close of the second day's session, when the meeting adjourned, the rules for the "controlled manual block system," which were reported by the committee, had not been reached and were not even mentioned. This is to be regretted, as that part of the report is more interesting than the part which was discussed. The committee has formulated rules for signaling by bell code. The principal bell code signals are the same as those used on the Erie and on the New York, New Haven & Hartford. It is highly desirable that a standard code for this method of signaling be established, so that, as it comes into more general use, uniformity may be secured by natural growth. At present there is only one road, of any consequence, besides the two named, which use a bell code, and that is the New York Central. The New York Central code differs in some respects from that of the other two roads.

#### October Accidents.

Our record of train accidents in October, given in this number, includes 60 collisions, 64 derailments and 7 other accidents, a total of 131 accidents, in which 49 persons were killed and 173 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident, as reported, make it of special interest.

These accidents are classified as follows:

COLLISIONS:	Rear.	But-ting.	Cross-ing and other.	Total.
Trains breaking in two.....	8	0	0	8
Misplaced switch.....	4	1	2	7
Failure to give or observe signal.....	5	0	4	9
Mistake in giving or understanding orders.....	1	3	0	4
Miscellaneous.....	1	2	3	6
Unexplained.....	11	4	11	26
Total.....	30	10	20	60

#### DERAILMENTS.

Broken rail.....	4	Track repairs.....	1
Loose or spread rail.....	1	Too quick application of air brakes.....	1
Defective bridge.....	2	Animal on track.....	4
Defective frog.....	1	Maliciously misplaced switch.....	2
Broken wheel.....	2	Malicious obstruction.....	1
Broken axle.....	5	Accidental obstruction.....	3
Broken truck.....	1	Unexplained.....	26
Fallen brakebeam.....	1		
Broken drawbar.....	1		
Loose wheel.....	1		
Misplaced switch.....	7		

#### OTHER ACCIDENTS.

Boiler explosion.....	1
Cars burned while running.....	3
Various breakages of rolling stock.....	1
Other causes.....	2
Total.....	7

Total number of accidents..... 131

A general classification shows:

	Colli-sions.	Derail-ments.	Other accid's.	Tot'l.	P. o.
Defects of road.....	0	8	0	8	6
Defects of equipment.....	8	11	2	21	17
Negligence in operating.....	26	9	3	38	29
Unforeseen obstructions.....	0	10	2	12	8
Unexplained.....	26	26	0	52	40
Total.....	60	64	7	131	100

The number of trains involved is as follows:

	Colli-sions.	Derail-ments.	Other accid's.	Total.
Passenger.....	21	15	4	40
Freight and other.....	39	49	3	91
Total.....	60	64	7	131

The casualties may be divided as follows:

	Colli-sions.	Derail-ments.	Other accid's.	Total.
Killed.....	22	18	0	40
Employees.....	3	0	0	3
Passengers.....	5	1	0	6
Others.....	30	19	0	49
Total.....	30	19	0	49
Injured.....	31	39	3	73
Employees.....	43	54	0	97
Passengers.....	3	0	0	3
Others.....	77	93	3	173

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. Killed.	Pass. Injured.	Emp. Killed.	Emp. Injured.
Defects of road.....	0	10	0	11
Defects of equipment.....	0	3	2	10
Negligence in operating.....	3	44	25	35
Unforeseen obstructions and maliciousness.....	0	5	5	9
Unexplained.....	0	35	8	8
Total.....	3	97	40	73

Thirty-three accidents caused the death of one or more persons each, and 24 caused injury but not death, leaving 74 (57 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with October of the previous five years shows:

	1895.	1894.	1893.	1892.	1891.	1890.
Collisions.....	60	92	132	96	120	152
Derailments.....	64	81	116	94	91	115
Other accidents.....	7	9	12	6	13	16
Total accidents.....	131	182	260	196	224	283
Employees killed.....	40	25	45	47	42	71
Others killed.....	9	19	52	15	16	17
Employees injured.....	73	107	140	83	10	264
Others injured.....	10	102	188	79	79	176
Passenger trains involved.....	40	65	99	62	67	97

Average per day:

Accidents.....	4.19	5.87	8.29	6.32	7.23	9.33
Killed.....	1.52	1.42	3.13	2.00	1.87	2.84
Injured.....	4.94	6.74	10.58	5.23	7.77	12.26

Average per accident:

Killed.....	0.36	0.24	0.37	0.31	0.25	0.31
Injured.....	1.18	1.14	1.26	0.82	0.79	1.34

Only three passengers were killed in train accidents in October, and one of these was a drover on a freight train. There were a six or eight bad accidents, however. Near South Bend, Ind., a whole passenger train fell through a burning trestle and was burned up. Near Savannah, Ga., there was a similar accident, at midnight, but fortunately the train was a freight. Twenty-two cars fell to the ravine below and were burned up. At Manor, Pa., a heavy passenger train was derailed while running at high speed, and the officers of the road say that they can discover no cause for the accident. At Bailey's, Pa., there was a very bad and costly wreck of a fast mail train due to the breaking of an axle on a freight train. Near Red Oak, Ga., there was a butting collision due to the forgetfulness of the engineer. The conductor pulled the signal rope as soon as he saw that the train was running past the proper meeting point, but not soon enough to prevent the collision. Apparently the rule requiring both engineer and fireman to read meeting orders was not in effect on that road. Experience has long since shown that the conductor is not always able to prevent disastrous consequences from the forgetfulness of an engineer, and it is also well known that only the most experienced and alert conductors even try to live strictly up to the rules on this point. Another case of forgetfulness was that of the engineer of a water train near Altoona on the 16th. Here, again, the joint responsibility of conductor and engineer proved to be of no value. According to the report of the coroner's inquest the engineer thought he had seen the passenger train pass him "and so informed the conductor." Of how much benefit on a train is a conductor who depends upon his engineer for such an important piece of information as this?

The collision at Hyde Park, Mass., was reported in the *Railroad Gazette* of Nov. 8. That near St. Louis, on the 29th, seems to have been due to heedlessness on the part of several men.

The derailment at Blackstone Junction, on the 5th, may be looked upon as directly attributable to the lack of suitable fixed signals.

The southbound trains and signals had been changed from the east to the west track, but the trains were changed all at once, while the change of signals had not been completed. The engineer probably had been notified that he must do without the signals for a week or two, and very likely he was enjoined to be unusually careful; but he dashed ahead to his death, nevertheless.

The report that a long train of live stock had fallen through a trestle 114 ft. high near Kiowa, I. T., Oct. 14, seems to have been a pure fiction of some reporter who found difficulty in amusing himself.

At Peterboro, Ont., on the 10th, a passenger train ran into an open draw, but the men who went down with the engine and baggage car swam out, and everyone else escaped unhurt. At Steubenville, O., on the 21st, four men in a wagon were killed at a highway crossing. Near Dupont, Ga., the engineer, fireman and two brakemen of a freight train were killed by the explosion of a saw-mill boiler, their train passing the mill at the moment of the explosion.

On the night of the 29th a passenger train of the South-

ern California ran about two miles with no person upon the engine, the train finally stopping on an up grade for lack of steam. Near Keenbrook, the engineer suddenly discovered an obstruction ahead which in the dense fog prevailing at the time he took to be a freight car, and he was so near to it that, without stopping even to shut off steam or apply the brakes, he jumped off, at the same time shouting to the fireman, who also jumped. The obstruction, however, was only a load of wood, and the engine knocked it one side and continued its journey. The fireman was not greatly injured, but the engineer suffered a bad fracture of one leg.

There were 14 electric car accidents in October, of sufficient consequence to get into the press dispatches. The most serious, that at Pittsburgh, killing 5 and injuring 9, was reported in the *Railroad Gazette* of Oct. 25. Street cars were run into by heavy locomotives, or themselves ran into railroad trains, at Washington, D. C.; Rahway, N. J.; Chicago and Cincinnati. Derailments occurred at Chicago and at Wilmington, N. C. In the latter case the street car jumped the track on a bridge and fell 80 ft., but there were only three persons in it and they were not killed. There was a runaway at Burlington, Ia., on the 17th. A half dozen collisions occurred at Hartford, Conn.; Middletown, N. Y.; Brooklyn, N. Y. (two), and Philadelphia (two). These accidents, taken as a whole, were not so disastrous as usual, the number of injuries, aside from those at Pittsburgh, aggregating only 25, and none of them fatal.

#### Annual Reports.

**Baltimore & Ohio.**—The annual report of the Baltimore & Ohio shows that this road has recovered more slowly than the other trunk lines from the depression of the last two years. The figures of the report also make it clear that the action of the directors in suspending dividends on the common stock during the present fiscal year, ending June 30, 1895, was quite in line with the conservative policy which has been recently followed by some of our stronger railroads, and does not indicate any serious financial difficulty. Still the recovery has been more gradual than had been expected, and the gross earnings show a remarkably small increase. An abstract of the general income account gives the figures in detail as follows:

	1894-95.	1893-94.
Gross earn.....	\$22,817,182	\$22,502,063
Oper. exp.....	15,801,044	15,560,689
Net earn.....	\$7,016,138	\$6,941,973
Miscel. income from other sources.....	1,627,595	1,982,857
Deduct on account of Washington Branch.....	174,409	205,001
Total net income available.....	\$8,469,324	\$8,719,830
Interest charges, rentals and taxes.....	6,759,643	6,522,582
Balance.....	\$1,709,681	\$2,197,248
Dividend payment.....		
1st & 2d preferred stock.....	\$300,000	\$300,000
Common stock.....	None.	624,955
Total dividend.....	\$300,000	\$924,955
Balance after paying dividend.....	\$1,409,681	\$1,272,313
Appropriation to retire funded deb.....	770,164	760,346
Surplus.....	\$639,517	\$511,968

According to this summary the increase in gross earnings is only \$314,520 which is decidedly small as compared with the showing made by most of the other Eastern railroads. All of the increase comes from the freight traffic, the earnings from that department for the year reaching \$15,591,062, as against \$13,916,476 for 1893-94. Passenger earnings have fallen off from \$6,431,058 in the previous year to the present figure of only \$5,049,097, a loss of \$1,381,961. The various causes which have brought about these results are easily traced. In regard to the loss in the passenger department, it is to be noted that the figures for the year are very near the normal earnings of the road, the revenue of the preceding year being phenomenal and due wholly to the World's Fair travel. The crop shortage in 1894 was a very unfavorable feature, especially for the Western lines of the B. & O. system. On the other hand, there was a big increase in the output of bituminous coal, after the strikes of the previous year had been fairly settled. This extraordinary activity in the bituminous districts was temporary, but was vigorous and long-lived enough to enable the railroad to show a large increase of earnings on what is perhaps the largest item in its whole freight traffic. The good effects of this fell almost entirely on the Eastern lines of the system, so that they have reaped all the advantages while the Western lines have suffered most of the hardships of the year. In fact, on the lines west of the Ohio there was an actual loss of \$252,656 in gross and \$269,697 in net. One evil influence, however, has spread over the whole system in the general demoralization of rates. The severity of the effects of this evil are partially hidden by the strict economies practised in the operation of the road, but it has done as much harm as all other conditions taken together. In view of this, it is to be hoped that the new Trunk Line agreement will live long enough to act as a remedy.

As to the details of the year's operations the following figures are of interest. The expense account of the road shows pretty large outlays, for it has recently been the policy to keep the roadbed and equipment in very high condition. The figures for the two years show an increase:

	1894-95.	1893-94.
Maintenance of equipment.....	\$2,092,716	\$2,052,105
Maintenance of way and structures.....	2,846,232	2,672,050

On the other hand, only \$641,306 was spent on new construction. The balance of available income, after deducting expenses, taxes, and fixed charges, was almost half a

million less than last year; but the surplus, after all deductions from the income account, amounted to \$639,517, a sum which would have just paid a 2½ per cent. dividend on the common stock. In spite of this the management felt it unwise to declare a dividend, in view of customary and proposed outlays.

The tonnage of the road is steadily increasing, as the following table shows:

	Tons carried.		Tons carried.
1890.....	13,988,176	1893.....	16,356,405
1891.....	14,858,972	1894.....	13,437,175
1892.....	15,738,859	1895.....	16,080,423

The hours of labor of railroad employees has been made the subject of a report by the British Board of Trade, under the Railway Regulation Act of 1893. This is the second annual report of the Board on this subject, and it covers 156 inquiries, more than double the number of cases dealt with in the preceding year. Most of the complaints have been on behalf of classes of employees, and they often requested that the names of individual employees be not divulged. This hindered the Board in getting direct evidence. The railroad companies have responded fairly to the demands made upon them by the Board, though in the cases of certain signalmen on the Great Northern and the Great Eastern the Board wants the hours of work reduced from 12 to 10 (and in other cases from 10 to 8), and the railroad companies will not make the change. Under the law the Board cannot take compulsory action, but must report such a case to the Railway Commissioners. Thus far no road has refused to reduce hours when the Board held unequivocally that the change was necessary in the interest of public safety. Employees often have complaints made before sufficient consultation with their fellow employees, and it sometimes follows that the majority of men in that class will request the Board of Trade to take no action, as a reduction of hours would, or might, mean a reduction of pay. Cases of very long hours, 16 and 18 hours a day, and some even longer, which were frequently heard of up to 1894, have not been reported this year, and this abuse is now believed to have been killed out.

During the six months from April 1 to Oct. 1, 1895, the number of changes of railroad officers in the United States, Canada and Mexico was 1,556. These are the figures as compiled in the office of the *Pocket List*, published quarterly by the Railway Equipment & Publication Co., New York City. For the first half of this period the changes were more than twice as numerous as in the second half. The names of 16 roads were changed during the six months and 377 railroads and private car lines were added to the list. The titles of the officers changed were as follows:

Receivers.....	39
Chairman of Board.....	2
Presidents.....	112
Vice-Presidents.....	110
Secretaries and Treasurers.....	173
General Counsels and Attorneys.....	36
General Managers.....	71
General Superintendents.....	26
Superintendents.....	123
Purchasing Agents and Store-keepers.....	33
Chief Engineers and Resident Engineers.....	70
Engineers M. W.....	10
Superintendents Signals and Telegraph.....	13
Superintendents Bridges and Buildings.....	13
Superintendents Motive Power.....	14
Master Mechanics.....	78
Master Car Builders.....	21
Road Masters.....	201
General Foremen.....	84
Foremen.....	328
Other positions not specified above.....	1,556

The exact distance and time between New York and San Francisco are not very easy to remember, especially for persons like railroad men, who haven't the time, and editors, who haven't the money, to make the trip very often; and it is, therefore, worth noting that since the establishment of the last fast train by the Union Pacific the time is almost exactly 100 hours. This is the apparent time. By Eastern time the train arrives at San Francisco at 11:45 p. m., making the actual time consumed on the road 103¼ hours, the apparent time being 100 hours 15 minutes. The distance is 3,332 miles (New York Central, New York to Buffalo, 440; Michigan Central, Buffalo to Chicago, 535; Chicago & Northwestern, Chicago to Council Bluffs, 490; Union Pacific, Council Bluffs to Ogden, 1,034; Southern Pacific, Ogden to San Francisco, 833.) The connecting train east of Chicago is the North Shore Limited, leaving New York at 4:30 p. m., and arriving in Chicago at 4:30 p. m. the next day. The rate of speed, through, is 33.27 miles an hour, which includes the 1½ hours' delay in Chicago. The rate of speed through from Chicago is 30.7 miles an hour, a trifle slower than we computed it in our first notice of the train, at which time the hour of arrival in San Francisco was given as 7:45 instead of 8:45.

#### NEW PUBLICATIONS.

*Poor's Directory of Railway Officials and Manual of American Street Railways.* New York: H. V. & H. W. Poor, 44 Broad street. \$3 a copy.

The reader receives at the outset an unfavorable impression, the several lists of contents and indexes being long and not very easy to refer to. Where there are several indexes in one book they should be distinguished from each other by typographical distinctions, and any long or complicated index needs an ingenious foreman in the composing room as well as the careful attention of an editorial critic.

It is obvious that a book of nearly 700 pages is something more than a directory of railroad officers, even though a

large proportion of the 700 pages are advertising pages! So many new features are added to each annual issue that the title has become quite inadequate as an index of the variety of information regarding all manner of corporation affairs which it contains. A directory in itself would not require 20 departments, the number contained in the volume just issued, the tenth annual publication.

The covers practically enclose three books, a directory of railroad officers, a summary of corporation statistics and a street railroad manual. Each of these subjects is treated with remarkable fullness and with a variety of information nowhere else so admirably arranged; but this division of material into three distinct parts is not observed in the volume, and some such classification ought to be made in future issues. To find a table of earnings followed by a list of officers, then by another financial table; next several other directories of officers; then again a statement of financial interest, lessens the handiness of the volume for quick reference. It is confusing and a needless aggravation.

The directory part is corrected down to Oct. 25, and bears the usual evidences of scrupulous accuracy attained in *Poor's Manual*. The first directory is alphabetically arranged by companies; this is followed by other lists of belt and terminal roads, logging and other private lines, and roads under construction. This is a convenient division of four classes of railroads which ought to be distinguished in such list, but which is not attempted except in this directory.

Then there are separate lists of General Managers and Superintendents, Master Mechanics, Chief Engineers, etc., other lists of traction companies and foreign railroad companies, and an index to each name mentioned in the foregoing lists. Finally, we have a list of the towns (arranged alphabetically under each State), which are the headquarters of railroad officers, or in which shops are located. This idea is not at all new, but it is here carried out more thoroughly than anywhere else. There is no list of officers of fast freight lines and private car companies.

The new features of the present issue are the extensive and valuable additions to the financial and street railroad statistics. There are tables showing the dividends paid by railroads, "traction" and other companies; the time and place of holding annual meetings, when the stock books close, and the names of the registrar of stock and transfer agent of each company. What is called "diary of annual meetings" shows first the annual meetings held each month, and then the annual meetings each day of the year. In still other tables are abstracted the chief items of financial interest of leading railroad companies, the mileage owned, capital accounts, passenger and freight statistics, earnings, interest payments and dividends. Another table shows gross earnings by months of the more important lines, for five years.

The portion of the directory recording street railroad affairs has grown in importance and completeness with the rapid development of street railroad interests in recent years. Many valuable financial statistics are published in the volume which are of special interest, because of the scantiness of information heretofore available regarding these securities. A tabular statement of many pages gives total mileage of each company, miles operated by electricity, cable, and horses; equipment, capital stock, and bonds. The returns of the individual companies have been summarized in a table showing the capitalization of companies, operation in each state summarized, mileage and portion using electricity, cable, etc., and equipment owned.

It will be of interest to repeat some of the figures which the summary presents. The total length of the street railroad lines in the United States equals 13,176 miles, an increase of 3,514 miles over those in operation in 1891. Of this total 409 miles are operated with steam dummies, 10,238 by electric power, 578 by cable, and 1,950 by animal traction. The number of horses owned by street railroad companies has declined nearly 145,000, or 71 per cent. since 1891. Companies operating 12,797 miles reported capitalization, which is shown to be \$520,745,823 stock and \$967,694,477 bonds, an average of \$40,691 per mile of stock and \$28,333 per mile of bonds, equal in the aggregate to \$69,024 per mile of stock and bonds as against \$56,611 per mile for steam railroads.

*The Railway World*, Philadelphia, Pa., will begin in its issue of Nov. 30 the publication of a series of articles by Mr. W. Hasell Wilson, C. E., entitled "Reminiscences of a Railroad Engineer." These articles will appear every week until the series is completed, which will probably be in eight weeks. It is not necessary for us to tell our readers who Mr. Wilson is, nor with what interest we look forward to the appearance of his reminiscences. We have very recently reviewed his little book on early railroad history, and he has taken some part in the effort made by some of our correspondents to get the facts straight with regard to certain early track.

#### The Awards at Atlanta.

A complete list has been published of the awards made to the exhibitors at the Atlanta Exposition. We print below those which will be of the most interest to our readers:

##### TRANSPORTATION DEPARTMENT.

##### Gold Medals.

Burnham, Williams & Co. (Baldwin Locomotive Works), Philadelphia.  
Newport News Shipbuilding and Dry Dock Co., Newport News.

The Plant System (of rail and water lines), Savannah, Ga.  
Pullman Palace Car Co., Chicago, Ill.  
The Southern Railway Co., W. shington, D. C.  
Rogers Locomotive Works, Paterson, N. J.  
Richmond Locomotive Works, Richmond, Va.

##### Silver Medals.

The A. French Spring Co., Pittsburg, Pa.  
The Q. and C. Co., Chicago, Ill.  
Ramapo Wheel and Foundry Co., Ramapo, N. Y.  
Ramapo Iron Works, Hillburn, N. Y.  
Safety Car Heating and Lighting Co., New York City.  
The Seaboard Air Line Railroad, Portsmouth, Va.

##### Bronze Medals.

Georgia Railroad Co., Augusta, Ga.  
McKee, Fuller & Co., Catasauqua, Pa.  
Sterlingworth Railway Supply Co., New York City.  
Standard Steel Works, Philadelphia, Pa.  
St. Charles Car Co., St. Charles, Mo.  
The Thomas Automatic Hand Truck Co., Chicago, Ill.

##### Honorable Mention.

American Steel Foundry Co.—Steel truck and bolster and car couplers.  
Southern Iron Car Line, Atlanta, Ga.  
Western & Atlantic Railroad Co., Atlanta, Ga.

##### DEPARTMENT OF MACHINERY.

##### Gold Medals.

The H. R. Worthington Co., Brooklyn, N. Y.  
The Straight Line Engine Co., Syracuse, N. Y.  
The Buckeye Engine Co., Salem, O.  
The Ideal Engine Co.  
The Frick Engine Co.  
The Lane & Bodley Co., Cincinnati, O.  
The J. L. Case Threshing Machine Co.—The Raymond gas engine.  
Niles Tool Works Co., Hamilton, O.—Machine tools.

##### Silver Medals.

The Knowles Steam Pump Works, New York, N. Y.  
James Leffel & Co., Springfield, O.  
The American Engine Co., Bound Brook, N. Y.  
The Weston Engine Co.  
The Bull Engine Co., Erie, Pa.  
The Thomson Water Meter Co., Brooklyn, N. Y.  
The Crosby Steam Valve Co.  
The J. H. McGowan Manufacturing Co., Cincinnati, O.—Direct acting steam pumps.  
The H. R. Worthington Co., Brooklyn, N. Y.—Water meter.

##### Bronze Medals.

The Morse Twist Drill Co., New Bedford, Mass.  
Henry Diston & Sons, Philadelphia, Pa.  
The Simonds Manufacturing Co., Fitchburg, Mass.  
S. A. Woods Machine Co., Boston, Mass.  
The Berlin Machine Works, Beloit, Wis.  
Riehle Bros.—Testing machine.  
The Westinghouse Machine Co., Pittsburg, Pa.

##### Honorable Mention.

James Leffel & Co., Springfield, O.  
John E. Sweet, President Straight Line Engine Co., Syracuse, N. Y.—Design and construction of the straight line engine.  
Joseph W. Thompson, Salem, O.—Design of Improvements in the Buckeye Engine.  
Henry Diston & Sons, Philadelphia, Pa.—Appliances for repairing saws.  
Armstrong Manufacturing Co.—Pipe cutters and threads.  
Lodge, Davis Machine Tool Co.—Drill press.  
The Simonds Manufacturing Co., Fitchburg, Mass.—Tool for repairing saws.

##### MINING AND FORESTRY.

##### Gold Medal.

Sloss Iron and Steel Co., Birmingham, Ala.  
Southern Railway Co.—Mineral products.  
H. W. Johns Manufacturing Co., New York City—Asbestos and its products; paints.  
Dr. B. E. Fernow, United States Department of Agriculture—The Forestry resources of the Southern States.  
Tennessee Coal, Iron and Railway Co., Nashville, Tenn.—Iron ores.

##### Silver Medal.

The Corona Coal and Coke Co., Corona, Ala.—A model of coal mine; block of coal showing thickness of seam.  
Mobile & Ohio Railroad, Mobile, Ala.—Original maps and statistics relating to the forests of Alabama.

##### Honorable Mention.

Georgia Railroad Co.—Mineral products from the line of road.  
Louisville & Nashville Railroad Co.—The process for crosscutting timber and its value as a protection against the teredo.

##### DEPARTMENT OF MANUFACTURES.

##### Gold Medal.

Manhattan Rubber Manufacturing Co., New York.  
Fairbanks Co., St. Johnsbury, Vt.  
Buffalo Scale Co., Buffalo, N. Y.  
Waterman Pen Co., New York.

##### Silver Medal.

H. W. Johns Manufacturing Co.—Asbestos curtains.

##### Honorable Mention.

Boston Belting Co., Boston, Mass.  
H. W. Johns Manufacturing Co.—Asbestos household articles.

#### United States Railroad Statistics for 1895.

The statistician of the Interstate Commerce Commission has issued a preliminary report on the income and expenditures of railroads in the United States for the fiscal year ending June 30, 1895. It includes the returns of 650 roads, whose reports were filed on or before Nov. 9, and the summary given to the press shows:

	1895	1894	1893
Mileage of roads reporting.....	164,329	164,329	164,329
Passenger earnings, millions.....	\$293.47	283.02	283.02
Freight earnings.....	683.02	683.02	683.02
Miscellaneous do.....	26.22	26.22	26.22
Total, gross do.....	1,002.71	1,002.71	1,002.71
Operating expenses.....	667.68	667.68	667.68
Net earnings (a).....	335.03	335.03	335.03
Gross earn. per mile.....	6.096	6.103	6.103
Oper. exp. per mile.....	4.119	4.103	4.103
Net earn. per mile.....	1.977	1.940	1.940
Other income, millions (b).....	31.06	31.06	31.06
Total " (a and b added).....	366.09	366.09	366.09
Fixed charges, etc., millions.....	336.35	336.35	336.35
Dividends paid.....	52.14	61.50	61.50
Deficit, millions.....	31.08	31.08	31.08

Passenger receipts fell off \$177 per mile as compared with 1894, while freight receipts show a gain of \$149 per mile. Passenger receipts were \$336 per mile less than 1893 and freight receipts show a decrease as compared with that year of \$755 per mile.

## TECHNICAL.

## Manufacturing and Business.

The Newton Machine Tool Works have moved into their new shops at Twenty-fourth and Vine streets, Philadelphia, which are provided with improved facilities for the manufacture of machine tools. The company issues a large catalogue of milling machines, cold saws, etc., which will be sent on application.

The Osgood Car Co. was recently organized at Portland to build and lease cars and car apparatus. The only officer mentioned in the charter is President and Secretary Emory F. Chaffee, of Somerville, Mass. It appears that no part of the capital stock of \$2,000,000 has been paid in.

The Elliott Car Works, of Gadsden, Ala., are now employing about 400 men on car work. The company has several large orders for cars which will provide pretty steady employment for this number of men for the winter. The company's pay roll is said to be now about \$12,000 a month.

The J. A. Fay & Egan Co., the well-known Cincinnati manufacturers of wood work machinery, have found it desirable to be directly represented in South Africa and have chosen Mr. Edgar C. Seebom as their agent. He will sail in a few days for Johannesburg, and his first work on arriving there will be to equip a large new lumber plant with all the modern tools necessary for such a plant. Mr. Seebom has been with the Fay & Egan Company for some time past as its agent in the Southwest with headquarters at New Orleans. The company states that the South African trade has been important for some time past, and that the demand already created there is alone large enough to warrant the residence of an agent in South Africa and the outlook for a much greater demand for wood working tools is very hopeful.

The Cleveland, Cincinnati, Chicago & St. Louis is to put in the metal foot guard made by the National Railway Foot Guard Co., of Columbus, O., on all its lines in Ohio.

The Goodwin Car Co., of Chicago, is to build 150 new dump cars under the company's patent immediately. The specifications for these cars are now being prepared. The cars to be built under them will contain many improvements in design and construction over the cars previously built under the Goodwin patents.

## New Stations and Shops.

The citizens of Gorham, N. H., in town meeting, have agreed to give the Grand Trunk Railroad a large tract of land in the town limits if the company will rebuild the shops now at Portland at Gorham.

Something was said a few weeks ago of the decision of Receiver Burleigh, of the Northern Pacific, to rebuild the burned Palouse shops at Spokane, Wash. Work on the foundations will be started at once, bids for this work having been given out last week. The plans for the buildings, which have been agreed, to provide for a machine shop 62 ft. x 162 ft., a store room 30 ft. x 100 ft., with a platform 60 ft. x 100 ft. The wood working building will be 50 ft. x 100 ft., just south of the machine shop, and there are to be car shops 60 ft. x 300 ft., and the oil house and sand house, two stories high, each 20 ft. x 30 ft. Coal bunkers with a capacity of 1,000 tons will be erected. The engine house will have 22 stalls.

## Iron and Steel.

It is reported that Andrew Carnegie is looking for a site for an iron works along the shore of Lake Erie, near the terminus of the Pittsburgh, Shenango & Lake Erie Railroad, at Conneaut, O. Mr. Carnegie, accompanied by Mr. Curry, Superintendent of the Homestead Works, and a number of officials of the road just mentioned, arrived in Erie on Nov. 25 and were supposed to be on a tour of inspection for the above purpose.

Press reports say that a new rail for street railroads is being made at the Johnson Co.'s works at Johnstown, Pa., having a greatly broadened flange.

The country's stock of pig iron is steadily decreasing, with a constantly growing demand for raw material. This stock amounted to not quite 500,000 tons on July 1, to 511,000 a month later and to 461,000 at the opening of September. They were reduced in September to 418,000 and last month to 396,000 tons.

## Hall Signals on the Lehigh Valley.

The contract for Hall automatic signals for the Lehigh Valley Railroad, which was noted in our last issue, is for the equipment of 186 miles of track. There are to be 186 block sections, each post having a home and a distant signal. The number of switches included in these blocks is 462, all of which will be equipped with indicators to prevent their being turned off from the main track when a train is approaching. When these signals are in place the Lehigh Valley will have 235 miles of track protected by Hall signals.

## Cast-Steel Driving Wheel Centers.

The Midvale Steel Company has been furnishing a large number of cast steel wheel centers for locomotive drivers of late, both to locomotive builders and to railroads, and the company believes that the day is not far distant when such wheel centers will be universally used. A short time ago they supplied steel centers for eleven locomotives for the Pennsylvania Railroad, built at Altoona. They were 72 in. in diameter, and weighed on the average about 2,300 lbs. in the rough. It is estimated that the saving was over one ton in weight for each engine by using cast steel instead of cast iron.

These steel centers are, of course, much stronger than cast iron of even heavier weight. The material from which they were made is about as follows:

Tensile strength, 65,000 lbs. per square inch.  
Elastic limit, 35,000 lbs. per square inch.  
Elongation, 32 per cent. in a test bar 4 in. long.  
Contraction, 56 per cent.

## Armor or Russian Warships.

The Bethlehem Iron Co. has just been awarded a contract for about 1,200 tons of armor plate for the new Russian battleship Rostislav. The armor is to be delivered by next fall. The Bethlehem Co. secured the contract from 13 other competitors. It represents about \$500,000 worth of armor.

## Flood Protection for Williamsport, Pa.

A meeting of the citizens of Williamsport who are interested in the question of protecting their city from further damage by floods, was held last week. A plan for protection, considerably cheaper than the one recommended by the recent report of Major Raymond and Mr. Schermerhorn, and described in the *Railroad Gazette* for Nov. 15, was proposed by S. T. Forsman and was discussed at considerable length. No plan was settled on. It was recommended that subscription books be opened for the purpose of receiving public subscriptions for the work.

## Nicaragua Canal.

The Nicaragua Canal Construction Company has been reorganized, and is now the Nicaragua Company. When the construction company failed in 1893 work was suspended, but now the Nicaragua Company is making preparations for resuming work under the contract which the construction company had with the Maritime Canal Company.

## A Large Fly-Wheel.

The Southwark Foundry & Machine Co., of Philadelphia, has shipped an immense 180,000-lb. fly-wheel, 28 feet in diameter, to the Joliet (Ill.) Steel Co. It will require a 30-in. shaft, and is over four feet across the face. It was transported at the rate of about eight miles an hour on two special cars belonging to the Baldwin Locomotive Works.

## The Moskowitz Electrically-Lighted Car.

The company which controls the Moskowitz patents for lighting passenger cars by electricity, by means of power derived from one of the axles of the car, has lately completed a handsome private passenger car which is equipped with the company's apparatus, including storage batteries to accumulate surplus power while the car is running for the purpose of lighting it when not running. This car, carrying a party of city officials and others, was run from New York City to Atlanta last week on the occasion of the Manhattan Day excursion.

## THE SCRAP HEAP.

## Notes.

The Grand Trunk and the Canadian Pacific companies have sent representatives to Ottawa to urge the Dominion Government to reduce the rate of duty paid on bituminous coal imported by railroads.

E. V. Debs was released from jail at Woodstock, Ill., Nov. 22. A train load of 500 of his friends went to that place from Chicago and lionized him. Among the crowd was Ex-Governor D. H. Waite, of Colorado, who came to Illinois on purpose to join in this performance.

The Secretary of Internal Affairs of Pennsylvania has given the Attorney-General the names of over 30 railroad companies which are liable to the statutory penalty of \$5,000 for not sending in an annual report. Most of these companies have never laid any track or done any work on their proposed lines.

The transfer coal pockets of the Delaware & Hudson Canal Co. at Carbondale, Pa., were burned Nov. 24, together with 25 cars and a quantity of coal. Loss \$30,000. The old passenger station of the Hannibal & St. Joseph at St. Joseph, Mo., was burned Nov. 24 with 18 cars of freight. Loss \$25,000.

In Newark, N. J., last week, a street car fender apparently assisted in killing a man instead of saving his life. According to the accounts in the daily papers the man was struck by a car which was running at high speed, and was caught up by the fender, but had his brains dashed out against the headlight.

The controversy concerning lands near Ashland, Wis., which the U. S. Government granted to the settlers, and which subsequently were decided by the courts to belong to the Wisconsin Central Railroad, has now gone so far that the farmers living on the land, who have made some improvements, have been notified to vacate. One hundred and twenty farmers received notices from Washington last week.

The car ferries of the Toledo & Ann Arbor Railroad will not run to Menominee this winter. The condition of Frankfort harbor is such that it is necessary to keep the company's two boats together to assist each other over shoal places. In order to make winter navigation through Green Bay a success it would be necessary to make daily trips and this cannot be done, as the company is in duty bound to touch at Kewaunee and this precludes the making of daily trips to Menominee when both boats are together. All freight from Menominee after January 1 will go by way of Kewaunee.

The controversy between the Pennsylvania Railroad and the village of Burlington, N. J., concerning the right of way for the road through the main street of that place, has now got into court. The company's main

line (single track) from Trenton to Camden, has occupied this street for many years. When the electric motors were put upon the Mount Holly Branch the company desired to lay an additional main track through this street, but the abutting property owners objected. It was reported a few weeks ago that these objections had been met or withdrawn, and it appears that such was the case; at any rate the company went on to lay the track, but when work was commenced further objections were made and on Tuesday of last week an injunction was secured. The hearing on the injunction was appointed for Nov. 25, but was postponed.

## The Niagara Falls Power Plant.

The Niagara Falls Power Company is asking for bids for the extension of the power house and wheel pit, in order to put in seven more 5,000 H. P. dynamos. It is stated that three of these will be put in as soon as possible, to furnish power for concerns that already contemplate building on the company's lands. The work is to be done within six months.

## Electric Funeral Car.

The Calumet Electric Company, of Chicago, is constructing a funeral car, which may be chartered to run to Oakwoods Cemetery. The car will be similar in respect to arrangement and appearance to funeral cars operated in other cities.

## Second Electric Locomotive for the B. &amp; O.

Electric locomotive No. 2 for the B. & O. has arrived at Baltimore, and will soon be in service.

## New Coaches for the Great Western, England.

The coaches which the Great Western is constructing for through traffic between the north and west of England are 58 ft. long by 8½ ft. wide, and are built on steel frames. Ease of running is secured by mounting them on two four-wheel bogies with a double set of hangers and springs. Each coach has seven compartments, not including that for the guard and luggage, and carries 9 first, 7 second and 32 third class passengers. The first and second class compartments have each a separate lavatory, while by means of a corridor two lavatories are made to serve for all the third-class passengers. Each coach, which weighs 23 tons, is lighted by gas, and provision is made for the application of steam heating apparatus now being fitted to Great Western stock.—*Practical Engineer.*

## Some Street Railroad Earnings.

The West End Street Railway Co., of Boston, reports earnings for the year ending Sept. 30, as follows:

	1895.	1894.	Inc. or Dec.
Gross earn.....	\$7,746,170	\$6,823,879	I. \$922,291
Oper. exp.....	5,633,163	4,807,083	I. 826,080
Net earnings.....	\$2,113,007	\$2,016,796	I. \$96,211
Fixed charges.....	746,963	72,064	I. 21,899
Balance.....	\$1,366,044	\$1,291,732	I. \$74,312
Dividends.....	1,102,525	1,193,375	D. 90,850
Surplus.....	\$263,519	\$88,357	I. \$165,162

The company paid on common stock 6½ per cent. in 1895 and 7½ in 1894. From the above surplus there has been charged off \$22,823, leaving \$40,696 carried to surplus account. Included in the expenses this year is \$240,000 for injuries and damages. Passengers carried, 155,231,506; passenger mileage, 22,180,125 miles; average receipts per passenger, 4.912 cents. Electric cars furnished 95.13 per cent. of the mileage, and horse cars 4.87 per cent. Reconstruction of tracks, \$115,891, charged to operating expenses, and total maintenance of tracks, \$692,051, against \$536,177 the previous year.

The Third Avenue Railroad Company of New York reports earnings for the year ending Oct. 31:

	1895.	1894.	Inc. or Dec.
Gross earn.....	\$2,583,011	\$2,007,804	I. \$575,207
Oper. exp.....	1,528,468	1,070,963	I. 457,505
Net earn.....	\$1,054,542	\$936,879	I. \$117,703
Other income.....	27,052	26,633	I. 419
Total income.....	\$1,121,394	\$963,472	I. \$158,122
Fixed charges.....	330,589	328,467	I. 2,122
Balance.....	\$791,004	\$635,005	I. \$155,999
Dividends.....	559,000	560,000	D. 1,000
Surplus.....	\$232,004	\$75,005	I. \$156,999

The general balance sheet shows cash on hand \$355,515 and a profit and loss surplus of \$323,789.

## The Cleveland Drawbridge Disaster.

The investigation of the drawbridge disaster at Cleveland is not yet completed, but the testimony thus far reported confirms the facts and opinions expressed by us last week. The total number of persons killed was 17. It appears that the apparatus for automatically cutting off the electric current from the trolley wire for a space of 500 ft., whenever the draw was opened, had not been removed as was reported at first, but had been allowed to go unused. Whether or not this was due to some breakage or defect, which was not promptly attended to, does not yet appear, but it had been out of use two or three weeks or more. One of the reasons mentioned for doing without it was the inconvenience to passengers in the evening, who objected to sitting in the cars without lights during the time that the current was withdrawn. On Monday, the second day after the disaster, this electric cut-out was again put in operation. On Friday morning last, about two o'clock, three cars on another high viaduct in Cleveland came near running off the end of the track when the drawbridge was open, or at least near enough to greatly terrify the passengers, who struggled violently to get out of the cars. One woman was injured and others fainted and had to be carried away in ambulances. It appears that the draw being opened and three cars being detained, the motormen and conductors got off and were engaged in idle conversation, when suddenly the third started forward, and, pushing the other two ahead of it, moved some distance at considerable speed. The foremost car, however, was held by tightly set brakes, and was driven forward only about a dozen feet. According to the reports it stopped only one foot short of the gates. It appears that the motorman of the third car had left his controller in a position to start the car whenever the current should return.

## Tonnage of the "Soo" Canal.

Traffic of the two Sault canals in October was 2,008,253 net tons, of which all but 11 per cent. was carried by the American canal. This is 143,000 tons less than was carried through the single American canal in the corresponding month of 1894. The decrease was due to the severe weather of the month, the low water in Lake St. Clair, which caused a tremendous blockade, and higher

Chicago grain freights. In all 866,921 tons of ore were passed, 80,000,000 ft. of lumber, 419,000 tons of coal, 1,313,000 barrels of flour, 10,052,000 bushels of wheat, and considerable other grain and merchandise. The total tonnage of the canal for the year has been so far 13,241,271 tons against 11,748,986 tons for the same period last year, and for the season will reach about 14,700,000 tons.

In connection with the tonnage reports of the Sault Canal the following tonnage summary of the waterways business of the German and French inland waterways for 1894, just received in this country, will be found interesting. There passed the German frontier on the Rhine 6,797,334 gross tons; Berlin received and shipped by water in the year 5,020,619 gross tons, while the total of all inland waterways in the Empire was 27,917,252 tons. In 1893 French waterways carried 25,200,000 tons. The Sault passed in 1894 14,779,363 tons, while the tonnage of the Detroit River for the same year is estimated at 39,000,000 tons.

#### "To Do Away with Curves."

"The Pennsylvania Railroad Company is making the necessary arrangements to do away with all curves wherever it is possible. This action is in view of the inspection made recently by the Board of Directors. Bids are now being asked for the straightening of the line on the Mount Joy section, and also on the Philadelphia, Wilmington & Baltimore division, from Iron Hill to Elkton." The foregoing is from a Philadelphia paper, and we copy it chiefly to show the alert intelligence of the headline editor. On reading the first two or three lines we expected momentarily to see the names of the contractors for the grading necessary to make an air line from Altoona to Pittsburgh, but that "wherever possible" dashed our hopes. The beautiful scenery of the Horseshoe curve and of the Juniata Valley will perhaps delight another generation of travelers.

#### Lake Notes.

The marine business of the combined ports of Duluth and Superior, representing the western end of Lake Superior, was for October 1,055,753 tons, of which Duluth furnished 685,752 tons. It is likely that the tonnage of these ports for the year will be about 7,000,000 tons. Chicago in 1894 handled a little over 10,000,000 tons of lake traffic.

Several lake shipbuilders are enlarging their facilities. The F. W. Wheeler Co. will probably double the capacity of their steel yard at Bay City, while the Jenks Shipbuilding Co. will move from the St. Clair River, and go into the building of metal ships. Negotiations are about completed for the construction of several new vessels.

The American Steel Barge Co. will employ 500 men in its shipyard this winter and will do from \$400,000 to \$500,000 in work. About \$300,000 of this will be on two modified whalebacks and the rest on repairs and dry dock business. The 500-ft. dock of the company has been constantly crowded with work all summer, and is likely to be reinforced by a second large dry dock this winter.

Three large wooden steamers are now under way at Davidson's West Bay City yards, and a fourth vessel is to be built this winter. Their aggregate cost will be nearly \$700,000.

A project long discussed for a dry dock at the eastern end of Lake Superior is likely to be realized this season. It is proposed to build a dock 500 ft. long, with gates larger and deeper than any on the lakes. It is much needed and should be a profitable undertaking.

The Flint & Pere Marquette road will build a steel car ferry boat 350 ft. over all, with a capacity for 25 to 30 loaded cars.

The season is proving exceedingly disastrous for the British and Foreign Lloyds that insured nearly all the better class of lake vessels at a low rate last spring.

Iron ore shipments from Ashland are now more than 2,800,000 gross tons, and from Two Harbors they have passed 2,000,000 tons. The highest full season's record for Ashland was 2,227,000 tons, and for Two Harbors 1,101,000 tons.

In the season just closing the lumber manufacturers of Minneapolis made about 495,000,000 ft. of lumber, those of the Duluth district, excluding the 25,000,000 ft. made in Wisconsin, made 430,000,000 ft., and other mills in the State produced about 275,000,000 ft., making a total cut for the year of nearly 1,200,000,000 ft. The Duluth district shows a large increase, but Minneapolis and outside mills have done less than at times before. Rail shipments from Minneapolis into the Southwest have been very large, while Duluth has left on docks over 200,000,000 ft., which high freight rates and Canadian competition prevented going East. At the close of navigation there is probably 500,000,000 ft. of lumber on docks along Lake Superior. This is a far larger quantity than ever before. Shipments out of the lake for the year have been so far nearly 800,000,000 ft., not quite as large as last year.

#### Tonnage of the American Marine.

The annual report of the Bureau of Navigation shows that the numbers and tonnage of our merchant fleet for the year have been nearly stationary. On June 30 it comprised 23,240 documented vessels of 4,635,960 tons, a decrease of 50,000 tons since June 30, 1894. This decrease is attributable to business inactivity two summers ago, the production of our shipyards in April, May and June this year much exceeding the production during the same months in 1894. The report recommends the repeal of certain navigation laws, and the passage by Congress of the free ship bill is again recommended.

#### Boston Harbor.

At a dinner of the Boston Merchant's Association held Nov. 15 the following resolution was adopted:

WHEREAS, The present commerce of the port of Boston places it second in importance in the United States; and

WHEREAS, The waterways into and within the harbor of Boston are inadequate to fulfill the requirements of its growing commerce and are insufficient for the largely increased size of modern steamships; and

WHEREAS, It is desirable that Boston, in order to retain its present commercial leadership, should be provided with ample waterways and safe approach es;

Resolved, That this association invites the Senators and representatives in Congress from this Commonwealth, and from all the New England States, to unite in asking from Congress an appropriation of not less than \$5,000,000, for the purpose of deepening, straightening and widening existing channels as far up as the Charleston Navy Yard to the depth of 30 ft. at mean low water and a width of not less than 1,200 ft. and of opening a fair waterway for vessels of the largest class through Broad Sound into the President Roads in Boston Harbor.

#### Railroad Economics in London.

A new educational movement has been inaugurated in London. It consists of the establishment of a school of economics and political science. Among the subjects to which attention is being devoted is "railway economics," upon which a course of lectures is to be delivered by Mr. W. M. Acworth. The director of this school

is Mr. W. A. S. Hewins, of Pembroke College, Oxford, one of the ablest of the younger economists and historians. The object in view is to popularize political science—which is practically an unknown quantity in this country, and the school is founded on the lines of the Ecole Libre des Sciences Politiques, in Paris. Among the lecturers is Mr. Graham Wallas, the well-known Fabian authority, who is to discourse on the English Constitution. The opening lecture was delivered by Mr. Hewins, who took for his subject "Commercial History."—*Transport.*

#### Recent Street Railroad Decisions.

The State Railroad Commissioners of Maine decide that there is no demand for an electric railroad between Portland and Gorham, for which a company has asked for a certificate. They find that the six passenger trains now running daily between Gorham and Portland earn only \$2 each; that if more trains are needed there is a better way to provide the additional accommodation than to build a competing road, and that the proposed road would accommodate very few dwelling houses between the two towns. Another objection to granting the present request is that the company may at some future time exercise its right to carry freight on the highway.

The Common Council of New Haven has concurred unanimously with the Aldermen in imposing an annual tax of \$700 a mile on a local electric road as a condition of allowing it to occupy a new street.

City Counsel Riker, of Newark, has decided that the Consolidated Traction Company, of that place, has no legal right to use its lines for freight transportation.

#### The Pilgrimage to Denver.

The doings of Francis Schlatter, the obscure German from the wilds of New Mexico, who has been performing instantaneous cures of sick persons at Denver, Col., for the past few weeks are probably known to the reader. It is said that the people of Colorado, Kansas, Nebraska and other states have flocked to Denver in such numbers as to crowd the trains, and the Union station at Denver often had the appearance of a hospital. On the day after Schlatter left Denver (suddenly and without notice) over 2,000 letters came for him, "largely from railroad men." The *Nebraska State Journal* reports the following incident:

OMAHA, Nov. 9.—A most remarkable scene was witnessed at the Union depot this evening when 150 Union Pacific employees and their families boarded the train for Denver to be cured by Schlatter. Two weeks ago the Union Pacific posted a notice that free passes would be given to all employees who wished to go to Denver to be treated by this man. No general request was made for passes until yesterday, when they began to pour in. This is the result of the experience of Division Superintendent R. B. Sutherland, who, after having been in a wreck three years ago, has been unable to move anything without pain and has been deaf. He was completely cured by Schlatter. Another large company of employees will go to-morrow. Some of the women were crying as they were getting on the train, and all were nervous, but full of faith that they would be cured. All along the line they were joined by other employees.

#### Proper but Unusual Gratitude.

On Sunday, at the close of a quarterly conference of Aroostook Free Baptists at Sprague's Mills, a rising vote of thanks was passed "to the Bangor & Aroostook Railroad, for their kindness in half fares to all religious organizations, also for their efforts in reducing freight on potatoes."

#### LOCOMOTIVE BUILDING.

The Lehigh Valley, according to a statement published in Philadelphia, is to follow up its recent equipment contracts with an order for about 25 locomotives.

#### CAR BUILDING.

The Chicago & Alton, it is rumored, will build 100 box cars.

The Louisville, New Albany & Chicago is said to propose to build 500 box cars this winter.

The International & Great Northern is running its car shops at Palestine, Tex., on new car work entirely.

The Baltimore & Ohio Southwestern is said to be in the market for 1,000 cars, divided between box and coal cars.

The New York, Chicago & St. Louis has ordered 500 cars, 400 to be built by the Michigan-Penninsular Car Co., the 100 by the Union Car Co. Three hundred will be box cars and the remaining 200 will be rail cars.

#### BRIDGE BUILDING.

Anderson, S. C.—Two 36-ft bridges are to be built over Saluda River at a cost of \$4,800. The contract has been awarded by the Supervisors of Anderson and Greenville counties to J. H. Whitner, Knoxville, Tenn.

Astoria, Or.—The Road Committee will receive bids up to Dec. 6 for constructing a bridge over the Lewis and Clarke River near Chadwell. C. S. Dow is Chairman of the Road Committee.

Baltimore, Md.—The Bear Creek drawbridge, which has lately been completed, is undergoing alterations necessitated by the refusal of the draw to work. The contractors will have it ready in a few days.

Beaver Falls, Pa.—The Overgrade Bridge Co. was chartered Nov. 19 to build an iron bridge over Big Beaver Creek from a point near Brighton Station on the Pittsburgh & Lake Erie to New Brighton. The directors are C. J. Connell, D. D. Miller, Theo. O'tman and N. B. Beaumont, Pittsburgh, and F. W. Patterson, McKeesport. The office of the company will be in Pittsburgh.

Boise City, Idaho.—We noted last week the opening of bids for the bridge over the Boise River at this place. These bids were as follows: Frank King, Nampa, Idaho, \$2,847; B. R. Poston, Boise, \$2,448; J. E. Rankin, Boise, \$3,225; H. T. Handy, Nampa, \$2,785; Wrought Iron Bridge Co., Canton, O., \$3,435. The contract was awarded to B. R. Poston, whose bid was \$2,448.

Bridgeport, N. J.—The work of tearing down the Broad street bridge over the Cohansey River was begun on Nov. 18. Work on the foundations for the new iron bridge was commenced. When it is completed it will be used by an electric railroad. The old bridge was built in 1869 at a cost of \$24,000.

Brooklyn, N. Y.—It is reported that the Committee of Supervisors of Kings and Queens counties, which has been considering plans for the proposed bridge over

Newtown Creek, has adopted a new set of plans for a bridge to cost \$250,000.

Denver, Col.—Bids will be received until Dec. 14 for a steel bridge over the Arkansas River in Prowers County. Also for a bridge across the Blue River in Summit County. H. A. Sumner, State Engineer.

Detroit, Mich.—The old River Rouge bridge has been closed by the authorities, being considered unsafe for use.

Great Neck, L. I.—Four bids were received on Nov. 9 by the Commissioners of Highways of the town of North Hempstead for a pile bridge over Udal's Pond at Great Neck. The bid of P. J. Mara, \$3,765, was accepted.

Harrisburg, Pa.—A joint committee of Councils and the Board of Trade have been selected to go to Philadelphia for a conference with the officials of the Pennsylvania and Philadelphia & Reading regarding the abolition of the grade crossings at Market and Herr streets. The Pennsylvania has expressed its willingness to act in the matter as soon as an agreement can be arrived at with respect to a division of the cost. City Engineer Cowden will present plans at the conference for an open cut under the tracks with a 24-ft. roadway and sidewalks of 8 ft. at Market street, also a drawbridge over the canal. The plan would cost about half as much as the overhead bridge at Herr street. An overhead bridge is wanted.

Houston, Tex.—The contract for the Hill street bridge, over Buffalo Bayou, has been awarded to the Columbus Bridge Co., of Columbus, O., at a contract price of \$38,746.

Indianapolis, Ind.—The second advertisement for bids for the bridge over Pleasant run, being a plate girder bridge of 75 ft. span and 30 ft. roadway, with two 6 ft. sidewalks, resulted as follows: Groton Bridge & Manufacturing Company, Groton, N. Y., \$5,500; Massillon Bridge Company, Massillon, O., \$5,140; La Fayette Bridge Company, La Fayette, Ind., \$5,080; Variety Iron Works, Cleveland, O., \$5,040; C. F. Hunt & Co., Indianapolis, \$5,010; Chicago Bridge & Iron Company, \$5,000; Wisconsin Bridge & Iron Company, Milwaukee, \$4,999; J. D. Adams, Indianapolis, \$4,995; Penn Bridge Company, Beaver Falls, Pa., \$4,994; Toledo Bridge Company, Toledo, O., \$4,945; James B. Nelson, Indianapolis, \$4,940; Wrought Iron Bridge Company, Canton, O., \$4,928; Shiffler Bridge Company, Pittsburgh, Pa., \$4,590.

Livingston, Mont.—Bids will be received up to Dec. 5 for a bridge to cross Tom Minor Creek at Pfohl's Ranch. Address Charles Angus, Clerk Board of County Commissioners.

Lowell, Mass.—Bids were received on Nov. 14 for the Moody street bridge as follows: Pennsylvania Steel Co., \$96,240; Carnegie Steel Co., \$65,438; Massillon Bridge Co., \$65,000; Toledo Bridge Co., \$65,425; Berlin Iron Bridge Co., \$60,739; Keppers & Thacher, \$59,990; Penn Bridge Co., \$58,990; King Bridge Co., \$58,570; J. E. Buddington, \$72,000; Groton Bridge & Manufacturing Co., \$57,500; Carter Bridge Co., \$68,788; New Columbus Bridge Co., \$68,500; Edge Moor Bridge Works, \$57,400; Boston Bridge Works, \$58,350; Wrought Iron Bridge Co., \$60,777; R. F. Hawkins, \$59,940; Dean & Westbrook, \$62,440; Norton Iron Co., \$76,634. The contract was awarded to the Groton Bridge & Manufacturing Co.

Montreal, Que.—Notice is hereby given that application will be made to the Parliament of Canada at its next session, for an act to incorporate "The Montreal and South Shore Highway Bridge and Electric Company" with power to construct a highway bridge from the city of Montreal across the St. Lawrence River, parallel to and as close as possible to the Victoria Bridge; said highway bridge shall consist of 24 spans with clear openings of 240 ft. between piers, and headways between bottom of truss and low water of not less than 40 ft.; also one channel span with a clear opening of 350 ft. between piers, and headway of 65 ft. between bottom of truss and low water.

It is stated that a syndicate composed of influential men has been formed for the purpose of obtaining a charter for constructing a highway bridge from this city to St. Lambert. It is intended to connect Montreal, via the proposed bridge, with Longueuil and Larabrie, by means of electric railroads. The bridge, as designed, will have ample roadways for wheeled vehicles, double tracks for electric cars, footpaths, and special accommodation for bicyclists. The cost of the bridge will be about \$1,250,000.

Newark, N. J.—The Hudson County Board of Freeholders has granted permission to the Consolidated Traction Company to erect a trestle over the tracks of the Delaware, Lackawanna & Western, at Sandford's Crossing, on the Kearny meadows. This will do away with the present change of cars and a walk across the network of tracks at that point, which was made necessary by the refusal of the railroad officials to allow the electric cars to cross the tracks.

New Orleans, La.—Bids will be received until Dec. 11 for an iron bridge over the New Orleans Navigation Canal at Claiborne street. Address C. R. Kennedy, Comptroller.

New York.—At a meeting of the Sinking Fund Commission of the New York & New Jersey Bridge, held Nov. 20, it was decided that the Board would approve the location of the New York terminus of the bridge between the southerly side of Fifty-ninth street and the northerly side of Sixtieth street.

Petaluma, Cal.—The city trustees have passed a resolution condemning the location of the new railroad bridge which is being built across Petaluma Creek. The grounds are that the bridge is an impediment to navigation.

Pittsburgh, Pa.—The city has instituted condemnation proceedings against the Smithfield Street Bridge Co. The bridge recently built by this company for the city has been examined by C. C. Snyder, Chief Engineer of the Penocyl Bridge Co., who says that it is able to carry any load that might be required.

Pittsfield, Mass.—It is reported that a new bridge is to be built at the crossing of the North Adams Branch of the Boston & Albany at Dalton avenue.

Pomeroy, Pa.—The Pennsylvania is replacing its old wooden bridge over the Wilmington road crossing near here with a four-tracked iron bridge.

Racine, Wis.—The city contemplates the expenditure of \$8,000 for protecting four bridges by piles.

Rochester, Pa.—The Ohio Bridge Co., which is building a bridge across the Ohio River at this point, has awarded the contract for the substructure to the Jutte & Foley Co., Pittsburgh, Pa., and for the iron work to the Penn Bridge Co., of Beaver Falls, Pa. We understand that the length of the bridge is about 2,300 ft., being a

suspension bridge of two 400-ft. shore spans and one 800-ft. channel span and about 700 ft. of approaches. The estimated cost is said to be about \$175,000.

**Sacramento County, Cal.**—The contract for a 191-ft. bridge, near Elk Grove, in this county, has been awarded to Silas Carle for \$715.

**Sioux City, Iowa.**—The iron work of the Pacific Short Line bridge over the Missouri River was completed on Nov. 18.

**Stanton, N. J.**—The contract for an iron truss bridge, 90-ft. span, with 16-ft. roadway, was awarded November 16 to the Horseheads Bridge Company, Horseheads, N. Y., for \$1,149.

**St. John, N. B.**—An iron bridge has just been completed under the plans and superintendence of City Engineer Peters, over Newman's brook, span 90 ft., two roadways of 12 ft. wide each and a sidewalk 6 ft. wide, bowstring girders; cost \$2,315 with \$400 additional for six granite piers for ends of girders.

**Suterville, Pa.**—There is considerable objection on the part of riparian owners above this place to the proposed bridge over the Youghiogheny at this point, on the ground that it would be an obstruction to navigation, the channel span being but 71 ft. long and but 30 ft. above low water mark.

**Syracuse, N. Y.**—Mr. H. F. Stephens, City Clerk, writes us concerning the award of the contract for repairing the abutments of the bridge over the Onondaga Creek, bids for which were wanted until Nov. 18, as follows: "No proposals have been received, as the engineer was unable to have the plans ready at the time. The work is not of great importance, both the repairing of the abutments and of the bridge probably not necessitating an expenditure of more than \$500."

**Topeka, Kan.**—On Nov. 5 it was voted by the people of Shawnee County to issue \$150,000 worth of bonds for the construction of an arch bridge over the Kansas River at Kansas avenue. According to reports it is said that the structure will be 700 ft. long in several arches.

**Ventura, Cal.**—Bids have been received for the steel trestle bridge over the Harmon Barranca on the road between Montaloo and Saticoy as follows: San Francisco Bridge Company, San Francisco, Cal., \$14,800, \$13,600; Thomson Bridge Company, San Francisco, Cal., \$11,500, \$10,080, \$9,030, \$8,035, \$7,200, \$6,425; Healy, Tibbitts & Co., San Francisco, Cal., \$10,678, \$9,970; Pacific Bridge Company, San Francisco, Cal., \$10,650, \$11,865, \$8,195, \$9,375; Excelsior Bridge Company, Los Angeles, Cal., \$9,565, \$9,125, \$8,315, \$7,841, \$7,502, \$3,665, \$3,443; Wrought Iron Bridge Company, Canton, O., \$8,520, \$7,414, \$7,256, \$6,511, \$5,120, \$7,014, \$6,856, \$6,111.

**Washington, D. C.**—Boring is now going on and will shortly be completed, under the supervision of the Government engineers to locate the foundations of a bridge over the east branch of the Potomac River at South Capitol street.

**Yellowstone County, Mont.**—The County Commissioners have bought the two toll bridges across the Yellowstone River at Billings, paying for them \$6,000 and \$14,000 respectively.

#### MEETINGS AND ANNOUNCEMENTS.

##### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

**Boston & Maine**, quarterly,  $1\frac{1}{2}$  per cent., payable Jan. 1.

**Catawissa**, 3½ per cent., on the preferred stock.

**Chicago, Burlington & Quincy**, quarterly, 1 per cent., payable Dec. 17.

##### Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

**Pittsburgh & Connellsville**, annual, offices B. & O., corner Smithfield and Water streets, Pittsburgh, Pa., Dec. 2, 11 a. m.

**Rome, Watertown & Ogdensburg**, annual, company's office, New York, Dec. 28.

##### Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

**The American Society of Mechanical Engineers** will hold its annual meeting at the Society's rooms, 12 West Thirty-first street, New York City, Dec. 3 to 6.

**The Western Railway Club** meets in Chicago on the third Tuesday of each month, at 2 p. m.

**The New York Railroad Club** meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

**The New England Railroad Club** meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

**The Central Railway Club** meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

**The Southern and Southwestern Railway Club** meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

**The Northwestern Railroad Club** meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

**The Northwestern Track and Bridge Association** meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

**The American Society of Civil Engineers** meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

**The Western Society of Engineers** meets on the first Tuesday in each month, at 8 p. m. The headquarters of the society are at 1736-1739 Monadnock Block, Chicago. The business meetings are held on the first Wednesday at its rooms. The meetings for the reading and discussion of papers are held on the third Wednesday at the Armour Institute, Thirty-third street and Armour avenue.

**The Engineers' Club of Philadelphia** meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

**The Boston Society of Civil Engineers** meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

**The Engineers' Club of St. Louis** meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

**The Engineering Association of the South** meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

**The Engineers' Society of Western Pennsylvania** meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

**The Technical Society of the Pacific Coast** meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

**The Association of Engineers of Virginia** holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

**The Denver Society of Civil Engineers** meets at 36 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

**The Montana Society of Civil Engineers** meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

**The Engineers' Club of Minneapolis** meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

**The Canadian Society of Civil Engineers** meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

**The Civil Engineers' Club of Cleveland** meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

**The Engineers' Club of Cincinnati** meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

**The Engineers and Architects' Club of Louisville** meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

**The Western Foundrymen's Association** meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. S. T. Johnson, Monadnock Block, Chicago, is secretary of the association.

**The Association of Civil Engineers of Cornell University** meets on Friday of each week at 2.30 p. m., from October to May, inclusive, at its association rooms in Lincoln Hall, Ithaca, N. Y.

**The Engineers and Architects' Association of Southern California** meets each third Wednesday of the month in the Hall of the Chamber of Commerce, Los Angeles, Cal.

**The Engineers' Society of Western New York** holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

##### Western Railway Club.

The regular monthly meeting of the Western Railway Club took place at the Auditorium Hotel, Chicago, Tuesday, Nov. 19, at 2 p. m. At the meeting of the Executive Board, which preceded the regular meeting, 70 new members were admitted. In announcing this fact to the Club, the Secretary said that most of these were from the Chicago, Milwaukee & St. Paul Railway, and that it was the policy of that road to encourage its employees to join this or some organization, realizing what a benefit they would obtain from reading the Club literature. He said further that this road had as members in the Club men in all grades, from the General Manager down to round house foremen and firemen.

##### WIDE FIREBOXES.

The discussion of Mr. J. Snowden Bell's valuable paper on Wide Fire-Boxes was then taken up, and naturally was very interesting.

A communication from Mr. George Cushing was read by the Secretary, in which he pointed out the loss in economy which might arise when the increase of grate area was not followed by a corresponding increase in heating surface in tubes, as it was impossible to obtain the benefits arising from large grate area—namely, the decrease in intensity of the combustion, or coal, per square foot of grate per hour—unless there was a large enough heating surface to absorb the heat generated.

Mr. William Forsyth, Mechanical Engineer of the C. & B. Q., said that last winter on their fast passenger engines 5,000 lbs. of coal was consumed per hour. This was on a grate having 25 sq. ft. area, and gives as the rate of combustion, 200 lbs. per square foot of grate per hour. This he considered too large for good economy, and in calculating the size of grate for their new engine No. 590 he desired to obtain from 100 to 125 lbs. per square foot of grate per hour. This engine has a grate area of 44½ sq. ft., and taking 5,000 lbs. as the total consumption in an hour, 111 lbs. per square foot of grate area per hour is the result. Mr. Forsyth did not think that the rate of combustion should exceed 125 lbs. to get economical results. He also said that the best results from a large grate area could only be obtained by proportionately large heating surface, and then showed a drawing of a boiler in which the firebox was constructed on the principle of the stationary boilers of the water tube type. This firebox had three drums connected on their front ends to the boiler proper, and located in the shape of a triangle, but two outer ones being above the frames and the center one on a line with the top of the boiler shell. The two lower drums were each connected to the upper one by water tubes and no stay bolts were used at all, except in the front water leg of the firebox; the space between the drums was filled with fire brick. By this arrangement he obtained 1,185 sq. ft. of tube heating surface in the firebox.

Mr. George Gibbs, Mechanical Engineer of the C. & M. & St. P., said that he had had but little experience with wide fireboxes except those of the Wootton type. He considered the firebox of the new Burlington engine No. 590 the best type brought out yet. He agreed with Mr. Forsyth in considering 100 to 125 lbs. of coal per square foot of grate per hour as the best for good economy.

Mr. Jacob Johann, Master Mechanic of the C. & A., had used two engines with Wootton boilers on the Wash some years ago and has as an objection to this type of firebox, the difficulty in keeping it tight.

Mr. G. W. Rhodes, Superintendent of Motive Power of the C. & B. Q., spoke of the experience he had had with two consolidation locomotives with Wootton boilers. They were in use on the Burlington ten years and were finally changed to another type on account of not being suitable for the work. The object of these large fireboxes is to use a very low grade of fuel, but such fuel is not obtainable in sufficient quantities out West. These consolidations were used on one of the Illinois divisions of the Burlington and the trouble with them was their insufficient steaming qualities. These engines were also very expensive to maintain, the firebox giving out in one-half the time of other ordinary locomotives, and there were great quantities of broken stay bolts. He said, in answer to a question, that they used screened coal on their new engine instead of "run of mine."

Mr. J. M. Barr, Superintendent of Motive Power of the C. & M. & St. P., gave as his objection to large fireboxes the increased number of stay bolts and consequently the increased breakage. He thought there might be some question about 100 lbs. of coal per square foot of grate per hour being the best for economy.

Mr. C. W. Higginson, of the C. & B. Q., was not in favor of large fireboxes on account of taking more coal

to cover, and although the rate of combustion would be less than in smaller fireboxes, yet the total coal would be larger and consequently they would be more expensive to run.

Mr. W. H. Lewis, Master Mechanic C. & B. & N., considered 100 lbs. of coal per square foot of grate per hour all right, and thought that the rate of combustion in small fireboxes was too high for economical results.

##### CAR DOORS.

After the recess, the topical discussion on "Freight Car Doors and Attachments" was introduced by Mr. Thomas Fildes, Division Car Builder of the L. S. & M. S., who spoke of the necessity of attaching the car doors so as to completely prevent them from falling off.

Mr. A. M. Waitt, General Master Car Builder of the L. S. & M. S., gave several instances of how passenger trains had been raked by the imperfectly hung doors of the cars in a freight train on an adjoining track. He said that they were improving their method of hanging the doors, and that he did not think doors should ever be supported on a bottom rail. Doors thus supported are more easily liable to be dislodged, and bad accidents happen from these causes. Several other members spoke of the importance of a good method of hanging the car doors, and Mr. William Forsyth described the doors that they were putting on the C. & B. & Q. new cars. They are supported on a trolley, and have the bottom rail attached to the door instead of the car. He showed also a design of the new fastening which does away with the objections of the old staple and hasp.

Mr. F. A. Delano, Superintendent of Freight Terminals C. & B. Q., spoke also of the importance of good fastenings for end doors, as the old method of fastening them with a hasp and sealing the door made it very hard for the inspectors to examine the seals. He thinks that end doors should have a catch, so that when shut they are securely fastened. He mentioned the M. & K. & T. as one road which had cars whose end doors dropped down and latched.

The paper of the day was on Air-Brake Equipment on Freight Cars, by Mr. A. M. Waite, and, as is customary with the Club, was read by title only. This paper will be discussed at the next meeting. An abstract appears in this issue. The paper for next meeting, as announced by the Secretary, will be on Locomotive Service, by Mr. J. H. McConnell, Superintendent of Motive Power of the Union Pacific Railway.

#### PERSONAL.

—Mr. O. M. Stimson, formerly with the Pullman Car Co., has recently been appointed Superintendent of the United States Car Co., in charge of its plants at Anniston and Decatur, Ala.

—Mr. John B. Stuart, Catasauqua, Pa., has been appointed General Manager of the Lehigh Valley Car Works, at Northampton, which are being made ready for a resumption of operation, at an early date.

—Mr. A. R. Zabriskie, who some time ago was connected with the New York Central & Hudson River road in New York City, has just been appointed General Freight and Passenger Agent of the Washington & Columbia River road, operating about 130 miles of road in Washington state. He has been Treasurer of that company for a year or so past, and is now succeeded in that office by Mr. J. G. Cutler.

—The friends of Mr. L. J. Seargeant, General Manager of the Grand Trunk, are arranging a banquet at which Mr. Seargeant will be the guest of honor, to take place before he leaves Montreal for London, where he goes to take his seat on the Board of Directors, to which he was recently elected. Those in charge of the arrangements for the banquet include the Chief Justice of Quebec, several members of the Parliament of Canada, Sir Joseph Dickson, formerly General Manager of the Grand Trunk; Sir William Van Horne, President of the Canadian Pacific; Mr. Andrew Allen, of steamship fame; the President of the Montreal Board of Trade, and other influential merchants and business men of Montreal.

—Mr. James S. Downs, a locomotive engineer of the Chicago & Alton, has been presented with a gold medal by a number of gentlemen who were passengers on a train, run by Mr. Downs, which was wrecked at Gardiner, Ill., Nov. 2. The accident was a collision which occurred in the night and was due to a misplaced switch. The fireman was killed and the engineer is credited with having mitigated the severity of the collision by sticking to his engine. The passengers made up a purse of \$150 on the spot and offered it to Downs, but he refused to accept it except upon the condition that he might give the money to the widow of the fireman. The money was given to the woman the next day, and the movement to present a medal was begun a few days afterward.

—Mr. George Olds, General Traffic Manager of the Canadian Pacific, who is now over 60 years of age and in impaired health, will probably soon relinquish most of the active duties of his position, and it may be that he will retire altogether from active service. He has formally notified President Van Horne that he will not be able to continue all his present duties. Mr. Olds has been General Traffic Manager of the Canadian Pacific since 1886, being the first officer to hold that position, coming to the road soon after it was opened for through operation. He has been in active railroad service nearly 40 years, most of that time in the freight department of the Chicago, Burlington & Quincy and the Chicago, Milwaukee & St. Paul. He was 14 years with the latter company, some time as General Freight Agent and later as Freight Traffic Manager.

—Mr. C. E. Schaff was last week appointed General Manager of the Cleveland, Cincinnati, Chicago & St. Louis, an appointment which has been anticipated as merely a matter of time since his appointment as Assistant General Manager. That appointment was made in September, 1894, Mr. Schaff having been previously Assistant to President Ingalls. Since the resignation of Mr. Ramsey as General Manager of the Big Four, shortly after Mr. Schaff's appointment as Assistant General Manager, the duties of that position being divided between Vice-President Murray, who is Traffic Manager, and Mr. Schaff. Before becoming assistant to the President of the Big Four Mr. Schaff was General Superintendent of the Peoria & Pekin Union road. He has had a long career and much practical experience in the transportation department of a number of companies.

—Mr. James T. Gorman, General Superintendent of the Philadelphia Traction Co., has just resigned after a service of 36 years for the street railroads of Philadelphia. Mr. Gorman has bought, for a single one of the companies with which he has been connected, more than 25,000 horses and has the reputation of being one of the best judges of such animals. He has given a reporter a sketch of his experience, which began when the princi-

pal street car company in that city had only 30 cars. At the time when electric and cable power began to come into use, the Philadelphia Traction Co. had 4,800 horses. In the early days the Market Street tracks were used for freight cars, the Pennsylvania Railroad using this line to reach its freight station at Dock street. There was also a freight station at Eighth and Market streets and a passenger station where the Bingham House now stands. During the horse distemper that prevailed in 1872, the street railroads were compelled to suspend service entirely on rainy days, and for some time every horse that worked had to be dosed with tar, belladonna and licorice when it left the stable. When the horses were all laid up, gangs of drivers drew cars with ropes and carried passengers at 25 cents a head. Small steam locomotives were used on Baring street Philadelphia, in 1874-6.

The new officers of the Atchison, Topeka & Santa Fe, so far as announced at the time of going to press, are E. P. Ripley, President; D. B. Robinson, First Vice-President; and Paul Morton, Third Vice-President. These are the appointments of the General Reorganization Committee, which under the plan of reorganization selects the officers and the members of the Board of Directors of the reorganized company. The appointments of Mr. Ripley and Mr. Robinson has been generally rumored, but the newspaper writers did not get hold of Mr. Morton's name. Mr. Ripley is the present Third Vice-President of the Chicago, Milwaukee & St. Paul, as such having charge of its traffic department. Practically all his railroad career has been in the freight department. In 1870 he went to the Chicago, Burlington & Quincy, starting as clerk to the General Eastern Agent of that company. He became Traffic Manager in 1887, after having served nearly 10 years as General Freight Agent, and in 1890 he was appointed Third Vice-President. For two years just previous to that he was General Manager of the road. Mr. Robinson has been acting as President of the Atchison since Mr. Reinhart's resignation. He was formerly First Vice-President, taking that office in March, 1893. His long career as General Manager of the Mexican Central, the Atlantic & Pacific and the San Antonio & Aransas Pass is very well known, and his administrative and executive ability are generally recognized. His appointment as First Vice-President will continue him in his present duties. Mr. Morton will be recognized, as formerly General Passenger Agent and later General Freight Agent of the Chicago, Burlington & Quincy. More recently he has been Vice-President of the Colorado Fuel & Coal Co.

Calvert Vaux, the eminent landscape architect, was found drowned in New York Bay on Thursday morning of last week. Although he had been ailing physically for a long time, his health had recently been improved, and his death just now is the more sad, since he was encouraged to hope for a speedy completion of his plans for the extension of the park system in New York City. It is believed that Mr. Vaux ventured into some dangerous position on one of the piers in the neighborhood of his home, and that he stumbled and fell into the water. Mr. Vaux was born in England in 1824, studied architecture there under Lewis N. Cottingham and came to this country in 1848. Here he formed a partnership with Andrew J. Downing and together they laid out the grounds surrounding the Capitol and the Smithsonian Institution in Washington. Following this he was engaged with Frederick Law Olmstead, in preparing the plans for Central Park in New York, which was the first seriously studied attempt in this country to change a waste of rocks into a beautiful and romantic pleasure ground. From this time until his death Mr. Vaux had been continuously employed in designing or improving the parks of New York, Chicago, Brooklyn, Niagara Falls, the Government Grounds at Ottawa, and many other places which live as monuments to his knowledge and industry. He was a man of fine perceptions in all artistic matters, and he was so modest that few, other than his intimate acquaintances, knew that he was an architect of conspicuous ability; but that this is so is evidenced by many buildings in and about New York, among others a large number which he designed for the Children's Aid Society, and some country houses. Mr. Vaux was the author of a work on architecture, entitled "Villas and Cottages." He was a member of the Greater New York Commission, of the Metropolitan Museum of Art, the Century Association, and at the time of his death was the landscape architect of the Park Department of New York City. Mr. Vaux leaves two sons and two daughters, Downing Vaux, C. Bowyer Vaux, Miss Marion Vaux and Mrs. H. H. Donaldson.

#### ELECTIONS AND APPOINTMENTS.

**Baltimore & Ohio Southwestern.**—At the stockholders' meeting last week these directors were re-elected: Edward R. Bacon, William L. Bull, Edgar T. Wills, Edward R. Bell, John H. Davis, William Mertens, W. W. Peabody, Frederick H. Alme, Lowe Emerson, Augustus B. Ewing, Frank W. Tracy, James Sloan, Jr. Francis Pary succeeds Patrick Buchan, the London director, deceased; Alexander Shaw succeeds Gen. Orland Smith as a Baltimore & Ohio representative; Henry W. Poor, of New York, succeeds John P. Heseltine, an English director. President E. R. Bacon was re-elected.

**Colorado, Wyoming & Utah.**—Prof. F. J. Stanton, of Cheyenne, Wyo., has been appointed Chief Engineer of this company, which proposes to construct a line south from Rawlins, Wyo., to Colorado and Utah.

**Lehigh & Wabash Dispatch.**—Mr. J. L. Glaser has been appointed westbound Agent of this line. Office, Room 10, Royal Insurance Building, Chicago, vice Mr. C. H. Rawlins, resigned to accept another position.

**Pennsylvania Co.**—Some changes in the engineering department of the Pennsylvania lines, Northwest system, have just been announced. William C. Wood, Jr., who has been located at Ft. Wayne, has been made Assistant Engineer of the Cleveland & Pittsburgh Division, and the position made vacant by his promotion has been filled by the advancement of W. C. Hazlepp, formerly at Lawrenceville Junction. Louis Hass has been made Assistant Engineer of the Ft. Wayne Division, to take the place of C. S. Sims, who was appointed Engineer-in-Chief of the Toledo Division. Mr. W. C. Wood is a nephew of General Manager Joseph Wood.

**Southern Pacific Co.**—N. H. Foster has been appointed Manager's Assistant of the Pacific System of this company.

The office of Auditor of Motive Power and Machinery has been abolished and that of Chief Clerk Motive Power Department established in place thereof. The Chief Clerk Motive Power Department will hereafter report to the Superintendent of Motive Power, but he shall, in all matters appertaining to the accounting of the expenditures in the Motive Power Department, be

governed by the directions of the accounting department.

**Washington & Columbia River.**—A. R. Zabriske has been appointed General Freight and Passenger Agent of this company, vice Charles Herman, resigned on account of ill health. J. G. Cutler has been appointed Treasurer of this company, vice A. R. Zabriske, transferred, both appointments taking effect from Nov. 1.

**Wilmington & Weldon.**—The stockholders met at Wilmington, N. C., Nov. 20. Warren C. Elliott was re-elected President, and B. F. Newcomer, H. Walters, Michael Jenkins, J. P. McCay, H. B. Plant, A. J. Deross, W. H. Willard, George Howard, E. B. Borden and J. W. Norwood were chosen Directors. All the officers of the company were re-elected.

#### RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

**Belton & Northeastern.**—The Texas State Railroad Commissioners have authorized the company to issue bonds for the proposed road in Texas, in accordance with the application filed with the Commissioners some time ago. The company was organized during the summer to build from Benton northeast to McGregor, Tex., a distance of about 25 miles. Surveys have since been made, and some right of way secured. The enterprise is a local one entirely, and D. C. Pendleton, of Belton, Tex., is President.

**Burlington, Cedar Rapids & Northern.**—This company has recently completed and put in operation a line about nine miles long, connecting two sections of the Forest City line, which have heretofore been connected by the track of the Minneapolis & St. Louis. Since the line to Armstrong in Northern Iowa, the Forest City division, was built a few years ago the Minneapolis & St. Louis track has been used for Madison Junction north of Iowa Falls to North Junction, beyond which point the new line extended to Armstrong, 46 miles. This year a line has been built from a point two and a half miles north of Garner to a point about one mile north of the Junction with the Minneapolis & St. Louis. This involves the building of 11 miles of new railroad and two new stations have been erected, one at Miller and the other at Forest City, the most important town on the extension. The old line, from a point two and a half miles north of Garner to Madison Junction, will be operated as a branch line. One mile of track from North Junction to the new line will be taken up.

**Charleston, Clendennia & Sutton.**—Track laying on this road, in West Virginia, has been completed from Charleston to the mouth of Pisgah Creek, Clay County, and trains are running to within a mile of that point, while construction trains are working to Pisgah Creek. It is expected to have trains running to Buffalo next month.

**Chesapeake & Western.**—A special election has been ordered by the County Court of Pendleton County, W. Va., for Dec. 7, to vote on the proposition to issue \$50,000 of county bonds for the stock of the road, in aid of the construction of a line from the Virginia State line to North Fork, in Cassville District, through the County of Pendleton by way of South Fork, Franklin, and Smith's Creek.

**El Paso & White Oaks.**—For five years or more the city of El Paso, Tex., has been doing everything that its municipal authorities could devise to secure the construction of a railroad from the city northwest into New Mexico, and to aid the project a valuable subsidy has been voted by the city. So far all that has been done is the grading for 20 miles out of the city. When the company became bankrupt it was understood that this property was secured by the Texas & Pacific, which seems afterwards to have transferred its claim to other interests who agreed to complete the road to White Oaks. This has not been done of course, but within the last week these people represented by J. L. Bell, of Chicago, have secured from the city of El Paso an extension of time in which to commence work and secure the subsidy voted by the city. They state that within 60 days they will be ready to begin work beyond El Paso to its terminus at White Oaks, New Mexico.

**Great Northern.**—President P. Garneau states that if the city loan of Montreal for \$250,000 is put in legal shape without further delay, the company will place additional sections of the road through Quebec under contract, and will also build car shops in Montreal.

**Hamilton, Brantford & Pacific Junction.**—This company is applying for incorporation in Ontario, to build a road from a point on the Toronto, Hamilton & Buffalo, near Copetown, Ont., to a point in East Flamborough, near Schaw Station.

**Hudson & Greenville.**—This road, recently organized to build a short road through Jersey City to the water front, is evidently in the interest of the Lehigh Valley. It would give the Lehigh Valley a continuous road to the water front on the Hudson River and a ferry to New York City. The new road is to connect with the Lehigh Valley Terminal road near Brown Place, in Greenville, and extend thence in a northeasterly direction through Jersey City to a point where the road running to the Lehigh Valley's freight depot at Jersey avenue and Grand street begins. The directors of the new company are: John Hood, of Camden; David S. Baird, of Beverly; Thomas W. Hulme and Frederick H. Lee, of Mount Holly; James F. Schaperkotter, William Beidler and Madison M. Meredith, of Philadelphia—all Lehigh Valley officers. The Lehigh Company owns the Morris Canal, and can build a road from Jersey avenue down to the river front on its own property.

**Ivonia & Lake Conneaus.**—The New York Board of Railroad Commissioners recently granted authority for the construction of this road under the provision of the general railroad laws that incorporators of a new company must receive such authority from the railroad commissioners before construction can be commenced. The line proposed to be built is a short one extending from a point on the New York, Lake Erie & Western, near Livonia village, in Livingston County, to a point near the town of Lakeville, on Conneaus Lake. H. B. R. Potter, of 619 Bergen avenue, Jersey City, is President of the company, and J. W. Boyle, of Utica, N. Y., is its attorney.

**Manchester & Milford.**—The projectors of this road, who were unsuccessful in their attempt to secure a charter in New Hampshire last year, are still keeping up their efforts to secure the incorporation of the road, and for some weeks past a new application for a charter has been heard before a committee at Manchester, N. H. The line is really an extension of the Brookline & Milford, and the application is supported by the Fitchburg road. The Boston & Maine and the Concord & Montreal op-

posed the construction of the road, and the attorneys of those companies have appeared at the hearings, in opposition to the granting of the charter. The road would start from Milford, N. H., just beyond the Massachusetts state line, the terminus of the Brookline & Milford, which is now operated as a branch of the Fitchburg. The terminus would be at Manchester, an important manufacturing district which is now reached by the Boston & Maine and the Concord & Montreal. In addition to giving that town a new railroad connection to Boston, the road would reach various local industries.

**Manistique & Northern.**—There seems to be some probability of this project for a line through the Northern Peninsula of Michigan, from Lake Michigan to Lake Superior, being carried out within the next year. The present officers state that the grading will begin in about a week, and that an effort will be made to make a fair start on the construction work this winter, before the cold weather prevents grading. The project is one of the many that seemed to have had some chance of being carried out when the financial disturbance of three years ago put an end to all such plans. The line is projected from Manistique, on the "Soo" road, north to Negaunee, just beyond Marquette, to connect the Duluth, South Shore & Atlantic and other roads. The line will pass through a good hard-wood timber country, and will give the iron mines about Marquette and the Lake Superior district a new port at Lake Michigan.

**Missouri, Kansas & Texas.**—The new Kansas City-St. Louis Line of this company has just been opened for passenger traffic between the two cities. Freight trains have been running for some weeks. This direct line is secured by the construction of about 25 miles of new road from Holden to a point near Sedalia, Mo. This closes the previous gap between the Paola Branch of the company's line and the main line at Sedalia. Entrance into Kansas City is secured over the company's line from Paola north.

**Monongahela River.**—A special meeting of stockholders will be held at Baltimore on Dec. 10 next to vote on a proposition to buy the lands, coal and coke plant of the Monongah Coal & Coke Co. of Fairmont, W. Va., the terminus of the Monongahela River road. The purchase is to form the basis for the construction of certain lateral branches to develop the coal territory naturally tributary to the road. The Monongah Coal Company is among the best coal properties in West Virginia and the stockholders are largely identical with those of the railroad, and for this reason, before any lines are built which will put competing coal on the market, it is desired to combine the managements. The location of the new roads under consideration is not made public, but among them is understood to be included the Monongah road, recently incorporated by Senator Camden and his associates, which will run from the Monongahela River road, near Clerksburg, to the Ohio River, by way of Binghamton and Fishing creeks.

**Montana Midland.**—Some work is now going on on the grading of this road east of Helena, Mont. A few years ago the grading from Helena to the Missouri River, about 20 miles east of the city, was completed and work then stopped. At present about 200 men are at work preparing this grade, which will be put in good condition before the weather prevents further work. During the winter men will be employed in the rock cutting near the Missouri River crossing. President Harlow expects that the first three sections comprising about 36 miles will be completed by Christmas, except through the Three-mile canon where there is much rock work which can be done during the winter. The work now going on is in charge of Chief Engineer Lombard.

**New Roads.**—Reports are current of a new survey being made from Canton, Ohio, to East Liverpool, Ohio, by way of Osaburn, Mapleton, Minerva, Robertsville, and Salineville. It has been hinted that the Baltimore & Ohio is supporting the enterprise, and that it is the ultimate intention to reach Pittsburgh, and improve the western outlet of the Baltimore & Ohio; but no authoritative statement can be had.

**Pittsburgh & Butler.**—This company was incorporated at Harrisburg, Nov. 23, to build a road from a point in the Borough of Etna, in Allegheny County, to Butler, a distance of 25 miles. The capital stock is \$250,000. F. Gwinner, of Allegheny, Pa., President. Directors, F. Gwinner, Jr., and Edward Gwinner, Allegheny, Pa.; Wilson A. Shaw, Sharpsburg, Pa.; John D. Nicholson, Wm. J. Mustin, and A. M. Neeper, Pittsburgh, Pa.

**Pittsburgh & Lake Erie.**—The short branch of this road to Fayette City, Pa., is to be opened by a local celebration of the usual order, which will include an address by the President of the road, J. B. Yohe. The new line is an extension of the Belle Vernon branch reaching the Upper Monongahela River, and is about three miles long. It starts from Belle Vernon and at Fayette City reaches an important mining district. A further extension of about six miles is talked of and may be undertaken next year.

**Rio Grande Northern.**—This road, in Western Texas, near the Rio Grande River, is now completed for the entire line of 26 miles, about 14 miles of which have been built since June. The road has been built to reach the San Carlos coal mines south of the Southern Pacific line and east of El Paso. The road leaves the Southern Pacific at Chispa station, in Jeff Davis County, and the mines are in Presidio County, just north of the Rio Grande River. The construction has been difficult, and has required the construction of four steel bridges, many trestles, and one tunnel in trap rock. The control of the railroad is owned by people in Pittsburgh interested in the development of the mines. G. L. Marshall, of El Paso, was the Chief Engineer of Construction.

**Roaring Creek & Belington.**—This road, which runs from Monroe, on the Roaring Creek & Charleston road, in West Virginia, to Belington, Barbour County, in the same state, has been completed, and rolling stock will be received within the next few days, when the line will be opened.

**San Francisco & San Joaquin.**—The construction forces on the road have reached a point nearly midway between Stockton and the Stanislaus River, or about 12 miles from the Mormon Channel crossing, just south of Stockton. The important bridges on this section are those over Tuolumne and Stanislaus Rivers, which are difficult to cross. East of the main line of the Southern Pacific the banks get high, and long approaches are made necessary to avoid heavy cutting. At the crossing of the Stanislaus three spans of 80 ft., a main span of 180 ft. over the river, and one of 80 ft. on the opposite side will be built. The piers are now being built and the work pushed ahead as rapidly as possible, in order to get them in before high water comes. The bridge has been contracted for, and is being built at Stockton. The work on the road is going on well, and about 4,000 ft., or nearly a mile of track a day, is being laid between Stockton

and the Stanislaus River. If there are no rains we shall have the track built to the river in three weeks. The bridge we expect to be ready for erection in six weeks' time.

**Stockton & Lodi Terminal.**—The grading for this road, which is being built for about 10 miles out of Stockton, Cal., is now practically completed, with the exception of about half a mile, where there is a disagreement as to the price to be paid for right of way over a valuable piece of land. At the present time construction work has been suspended. Mr. James A. Louttit, the director having charge of the financial arrangements, states that the directors have secured all the funds necessary to complete and equip the road. Some propositions have been made to operate the road by electricity instead of steam, as has been proposed, and until that question has been settled no further work will be done.

**Sunny Side, Hamburg & Western.**—The local representatives of Austin Corbin, President of the Long Island road, who is the chief stockholder in this proposed road, announce that Mr. Corbin is ready to begin the construction of this road west of the Mississippi River as soon as the counties through which it is to pass grant the land subsidy which he has asked. This is about 80,000 acres of land, and it is said that the people are willing to grant this tract to the company. The road itself is to be constructed from a town called Sunny Side, on the Mississippi River, west through the town of Hamburg to a connection with the St. Louis, Iron Mountain & Southern, at or near a new town called Corbin City. It is stated that the road will be completed that far by July next. It is projected by Mr. Corbin to give a railroad connection to a large tract of ranch land at present owned by him in Ashley and Chicot counties in Arkansas. The latter county at present has no railroad connection.

#### Electric Railroad Construction.

**Bennington, Vt.**—The Bennington & Rutland will probably substitute electricity for steam power on the branch line between Bennington and North Bennington. It is expected to have the changes completed early in the Spring.

**Brooklyn.**—A number of applications for new trolley lines in Brooklyn are now before the Alderman for action. The most extensive being that of the East River & Atlantic Ocean Company, recently incorporated with a capital of \$3,000,000, and which is virtually another name for the Nassau Electric Company. This began operations a few months ago, but has been badly handicapped through its want of connection with the suspension bridge and ferries. The applications of the new company for franchises cover over twenty miles of track, and include routes extending from Newtown Creek to the bridge and the New York ferries. The applications were all referred to the Railway Committee, and Dec. 6 has been fixed as the time for a special hearing.

**Buffalo, N. Y.**—The Buffalo Railway Company commenced a cross-town road last week through Court street, connecting the West avenue and Broadway lines.

**Hagerstown, Md.**—The Hagerstown & Potomac Electric Railway Co. has awarded the contract to build an electric street road in Hagerstown and extensions to Williamsport and Funkstown to the Harrisburg Construction Co.

**Langhorne, Pa.**—Work on the Newtown, Langhorne & Bristol road was begun at Langhorne last week by G. H. Brubaker, the contractor, with a force of 50 men.

**Meadville, Pa.**—The City Council recently granted an electric street franchise to the Meadville Street Railway Co. George Trawin President. The company will pay \$4,000 bonus and one per cent. of gross earnings after five years, and three per cent. after 10 years, agreeing to build and operate 6½ miles of track in one year.

#### GENERAL RAILROAD NEWS.

**Baltimore & Ohio.**—The company reports earnings for October as follows:

LINES EAST OF THE OHIO RIVER.			
	1895.	1894.	1893.
Gross earn.....	\$1,687,515	\$1,635,595	\$1,613,355
Oper. expen. ....	1,083,324	1,012,634	1,017,630
Net earn.....	\$604,191	\$622,961	\$595,755
Net four months.....	2,291,217	2,429,872	2,571,903
LINES WEST OF THE OHIO RIVER.			
	1895.	1894.	1893.
Gross earn.....	\$555,500	\$519,815	\$699,366
Oper. expen. ....	397,320	370,816	394,635
Net earn.....	\$158,180	\$148,999	\$304,731
Net four months.....	537,387	596,026	800,553

**Buffalo & Southwestern.**—This road has been formally merged with the new Erie company and loses its separate corporate existence. The line extends from Buffalo to Jamestown, a distance of 66 miles. Since July, 1880, it has been operated under lease by the Erie for 35 per cent. of the gross earnings up to \$325,000, and 25 per cent. of any excess. The preferred stock pays 7 per cent., and the common, which pays dividends after payments on the preferred, paid 1 per cent. in 1889, 1890 and 1891, and 2 per cent. in 1892.

**Grand Trunk.**—The following earnings are reported for September:

	1895.	1894.	1893.
Gross earn.....	\$1,885,513	\$1,772,767	\$1,843,745
Oper. exp. ....	1,112,125	1,112,675	1,260,313
Net earn.....	\$373,388	\$560,087	\$583,432
Prop. exp. to gross.....	66	604	689
Net earn., 9 months.....	\$3,850,688	\$3,613,791	\$4,066,954

**Green Bay, Winona & St. Paul.**—The application of the Farmers' Loan & Trust Co. for a decree ordering the sale of the road at foreclosure has been granted by Judge Seaman, of the United States Court at Milwaukee. Last week, when the Trust Company filed this petition, application was made by other interests for the appointment of a new receiver, and to have the issue of an order of sale postponed.

**Little Rock & Fort Smith.**—For the fourth time the foreclosure sale of this road has been postponed, and the date now fixed is Jan. 22. The first sale was fixed for April last, but a postponement was secured. The third date fixed was Nov. 20, but on that day it was announced at Little Rock that a fourth postponement has been made.

**New York, Pennsylvania & Ohio.**—The Farmers' Loan & Trust Co., of New York, has filed an action in Common Pleas Court at Akron, O., asking the appointment of a receiver for the company. The petition

was made to foreclose the mortgage for \$35,000,000, now amounting to \$72,000,000 because of accrued interest. Judge A. C. Vortis appointed Vice-President John Todd, of Cleveland, Receiver. This action is taken preparatory to the anticipated purchase of the road by the reorganized Erie road.

**Oregon Extension.**—The Oregon Extension Company has applied for a Receiver in the Federal Court at Seattle, Wash., covering its interest on the property operated by the Oregon Railway & Navigation Company under the Receivership of Edwin McNeil and asks that the Receiver be ordered to pay the interest now due on certain mortgage bonds held by the Bay State Trust Company, on which a foreclosure suit is pending. The petition says that the Receiver has sufficient earnings in his possession to do this, but he has avoided it in the interest of the trust company, which in reality wants to foreclose on the property on the pretext that interest is in default.

**Port Royal & Western North Carolina.**—The property of this company was purchased in the interest of the Reorganization Committee of the Central of Georgia at the foreclosure sale at Augusta, Ga., on Nov. 20. Through this purchase, which has been anticipated, the line will again be operated by the Central of Georgia as previous to 1893, when, after the appointment of receivers for the Central of Georgia, security holders of this company and of the Port Royal & Augusta secured the appointment of independent receivers for the two roads. As recently stated, the Port Royal & Western North Carolina operates about 230 miles. The main line extends from Augusta to Spartanburgh in Western North Carolina, 130 miles.

**Seattle, Lake Shore & Eastern.**—The decree of foreclosure against the railroad company has been signed by Judge Hanford, of the United States Court at Seattle, and Feb. 3, 1896, fixed as the date of redemption.

#### Electric Railroad News.

**Baltimore, Md.**—The City and Suburban Railway Company began to run cars Saturday from Lombard street, in the western part of the city, to Catonsville on a schedule of 12 minutes and to Loudon Park every six minutes.

**Brooklyn.**—The Westinghouse, General Electric and the Enholme Conduit Trolley Companies have made application to the New York & Brooklyn Bridge trustees to have their motors tried on the bridge cars, and it has been decided to allow the Westinghouse and General Electric companies to equip cars with their motors and subject them to a thirty days' test. General Electric motors will have the first trial.

**Buffalo, N. Y.**—The Buffalo & Niagara Falls Railroad is doing a large business. The road has not been in operation three months, but it has carried an average of 3,000 passengers a day. It is said they have paid the running expenses and the interest on the bonds.

**Detroit, Mich.**—The Detroit Railway has issued \$1,800,000 worth of \$1,000 bonds with interest payable semi-annually at 5 per cent.

**Hartford, Conn.**—The Hartford Street Railway Company, the largest trolley corporation in the state, reports from about 61 single-track miles gross receipts of \$405,546 and net \$92,074 for the year. Its outstanding stock is \$200,000, and bonded debts \$1,344,000.

**Middletown, Md.**—The directors of the Frederick-Middletown Electric Railroad last week awarded contracts for grading between Middletown and Braddock Spring, 3½ miles. This distance was divided into five sections. The first and second sections from Middletown were awarded to Lewis F. Kefauver, the third and fourth to D. Edward Kefauver, and the fifth, from the summit of Catoctin Mountain to the Spring, to Mr. Main. The officers of the road are: President, George W. Smith; Vice-President, D. E. Kefauver.

**New Haven, Conn.**—The Waterbury Traction Co. reports net earnings for the last fiscal year of \$48,618. It has about 11 miles of trolley track in operation.

**New Orleans, La.**—The Orleans Street Railroad, an overhead trolley line, has just been finished. A car containing the officials and directors went over the road last week.

**New York.**—The control of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway Co., has been obtained by the Third Avenue Railroad Co., by the purchase of a majority of its capital stock. The price paid is said to have been a little over par. The lines operated by the company are what is known as the Boulevard line, from East Thirty-fourth Street Ferry through Forty-second street to Fort Lee Ferry on the west side, the Forty-second Street Ferry line to the West Shore Ferry, the Tenth avenue line, and the 110th street line. The motive power on the Boulevard line will probably be changed, but whether cable or underground trolley would be used is not decided.

The Metropolitan Traction Company is preparing to lay a new rail on its lines, with a wider flange than the style now in use. It is believed that the change will make it easier for vehicles to turn out of the track and so facilitate travel. The company has prepared a complete map of its system, as at present operated, including the new acquisition, the Eighth Avenue line just acquired. The map shows a total mileage on the horse-power lines of 111 miles, exclusive of the Eighth Avenue lines, while the mechanical traction lines aggregate only 32.1 miles; but more than one-half the company's gross earnings come from the lines run by cable and electric power.

**Philadelphia.**—The District Surveyors have lately approved the plans of the Delaware & Schuylkill Electric Railroad, to be built in the Twenty-third Ward.

#### TRAFFIC.

##### Traffic Notes.

The Iron Steamboat Co., running a large number of steamboats and carrying passengers between New York City and Coney Island, reduced the round trip fare last summer to 25 cents, the rate in former years having been 40 or 50 cents; and the annual report of the company, just issued, states that the reduction was a success, the income having been largely increased.

The action of the principal railroads, both East and West, in charging extra baggage on bicycles, has been noted in these columns. Now the New York Central, which was one of the first to make a charge for bicycles and baby carriages, has announced that after Dec. 1 the rate on these articles will be 20 per cent. of the first-class passenger fare. This is about 75 per cent. higher than

the rates now charged. Payment is to be made by the purchase of a coupon ticket, one part of which is to be given to the baggage man and the other retained by the passenger as an identification card. The conditions of carriage are printed on the tickets and the releases heretofore exacted will be abandoned.

Competition in passenger rates between San Francisco and Portland, Or., which began two or three weeks ago, has brought the fare down from \$25 to \$5, including a berth in the sleeping car. The Southern Pacific Railroad and the Oregon R. & N. Company's steamers are the competitors. On the steamer a passenger gets, for his \$5, transportation and board for two days. Travel is very heavy. On the night of Nov. 19 about 800 people left Portland for San Francisco. The Shasta special over the Southern Pacific was sent out in two sections, carrying in all 343 first and second-class passengers. The second section was made up of 13 tourist sleepers, one day coach and one baggage car, making the longest passenger train that ever left Portland. The steamship State of California left her dock at eight o'clock with 145 first-class passengers, 126 second-class and 50 reservations at Astoria. More than 50 persons were refused passage for lack of room.

The interested railroads have agreed with the Kansas City business men that they will restore rates on grain from Nebraska points, concerning which the Kansas City Board of Trade charged discrimination against that city.

#### Chicago Traffic Matters.

CHICAGO, Nov. 25, 1895.

The Western Passenger Association agreement has been perfected and will become effective Dec. 1. As noted last week, Mr. B. D. Caldwell was re-elected chairman by a unanimous vote. The executive committee elected consists of Messrs. C. S. Crane, of the Wabash; P. S. Eustis, of the Burlington; H. C. Townsend of the Missouri Pacific; John Sebastian, of the Rock Island, and F. H. Lord, of the Chicago Great Western.

No progress has been made toward the formation of a passenger association to control trans-Missouri traffic, and it is unlikely that anything will be accomplished until all the transcontinental lines signify their intention of joining a new association.

It is thought that the Southern Pacific will not persist in its attempt to force business to and from Utah common points via San Francisco, but that, having posed as a friend of the San Francisco interests, it will gracefully withdraw. Of course, the Eastern lines will have it in their power to make such rates east of Ogden as they see fit, and can hold the whip over the Southern Pacific until rates are brought down to a point where it might become foolhardy to longer continue the contest.

The lines west of Chicago will put in effect on Dec. 1 a party rate of two cents a mile for parties of ten or over traveling on one ticket. Rates for special trains chartered within the territory of the new association have also been somewhat reduced. A storage charge of 25 cents for the first day and ten cents for each day additional is to be imposed on baggage remaining on hand over 24 hours.

The Chicago shippers and the railroads are not in full accord regarding the operation of tariffs under the new Illinois classification which was recently put into effect. Meetings are being held with a view to adjusting the points of difference.

The chairman of the State Board of Railroad and Warehouse Commissioners is quoted as saying that the suit to be brought against the Alton in the stock yards switching case is merely a friendly proceeding in the nature of a test case, and that the Board is not inclined to look upon the position the roads have taken as in any way hostile to the Commission.

Chairman Midgley of the Western Freight Association has issued notice to the members of the new Western Trunk Lines Association that it is proposed to make the percentages covering the distribution of traffic through Southwestern Missouri River gateways retroactive to Nov. 15, when the same are finally adopted, and that no apprehension need be felt that the agreement will not ultimately be put into full effect.

The advisory committee of the western lines, in charge of immigrant traffic, was unable to come to any understanding with the Southern Pacific, and instructions have been given to the joint agent in New York to meet any commissions on this business offered by the Southern Pacific via the Sunset route and to route all possible California business via the Atchison, Topeka & Santa Fe from Chicago, to the exclusion of the Southern Pacific. The trouble grew out of an arrangement made with one Fugazi, an immigrant agent in New York, who went to Europe and is actively at work paying commissions to influence business via the Sunset Route. The Union Pacific accused the Southern Pacific of being a party to this scheme, but the Southern Pacific denied it. Investigation developed the fact that Fugazi is being employed by the Seaboard Air Line, the eastern connection of the Sunset Route, and the other lines promptly asked the Southern Pacific to join the clearing house and accept a division of the business, the same as the other members. The Southern Pacific temporized with the matter until the other lines lost patience and took action as above noted.

#### A Proposition to "Indignate."

Ministers generally are very sore over the recent action of the Western lines and the Central Traffic Association in resolving to charge them two cents a mile [instead of about 1½ cents as heretofore]. Efforts are actually being made to call an indignation meeting and not only formally protest but actually refuse to accept under conditions which they interpret as meaning hostility to the ministry. It is claimed that when transportation is applied for now, there is so much circumlocution and annoyance and implied suspicion as to identity, that many prefer to pay the full fare rather than be subjected to such humiliating tactics. It will be interesting if the ministers do indignate.—*Cincinnati Times-Star*.